LAYMOR™

SWEEPMASTER 300

PARTS MANUAL

01 May 2015

9107139

LayMor **401 Capacity Drive, Longview TX 75604-5341** **1-800-458-3238** **Fax 903-297-7903**

Safety Precautions

- Always wear safety goggles when working with or testing the hydraulic system.
- Always relieve pressure from the hydraulic system before performing any maintenance or service actions on lines, valves, cylinders, and motors.
- Always check the temperature of hydraulic components before performing any maintenance or service actions. Hydraulic systems run at very high temperatures, and contact with hot hydraulic fluid can cause serious burns or injury.
- Always set the parking brake before any maintenance or service actions to prevent the sweeper from rolling. Chock wheels when required.
- Always have an operator in the seat when performing any test with the engine running.
- When trying to locate hydraulic leaks, use a piece of cardboard or paper. NEVER use your hand to locate leaks. High pressure hydraulic fluid leaks can penetrate the skin and cause severe injury.

California Proposition 65 Warnings

- Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.
- Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. **WASH HANDS AFTER HANDLING THESE ITEMS.**

Towing Instructions

Before towing perform the following steps.

1. Securely fasten hitch to tow vehicle.
2. Attach safety chains, electrical cable, and breakaway cable to tow vehicle.
3. Set steering valve to tow position.
4. Disengage rear wheels by pulling out and turning the hub disconnect handle.
5. Disengage parking brake.
6. Check hitch and lights for proper operation and local code compliance.

After towing perform the following steps.

1. Set the parking brake.
2. Engage rear wheels by turning hub disconnect handle and allowing spring return to engage position.
3. Set steering valve to operation position.
4. Disconnect hitch, safety chains, breakaway cable, and electrical cable.

Ordering Parts

Parts Orders Please supply part number(s) and the description of the items when placing an order. Specify model and serial number of the equipment when ordering parts to ensure correct parts identification. Your orders may be placed by phone, on our web site, or by fax to the direct parts fax line:

Fax Orders To: (903) 297-7903
Phone Orders: (800) 458-3238
www.Laymor.com

Shipping Information

Stock orders will be shipped within 2-3 days. Cut off time for air shipments to leave the same day is 5:00 p.m. Central Time. Air freight shipments and unit down shipments will take priority. Orders placed after the cut off time may not be shipped until the following day.

Ship Direct Parts

Mobile Products, Inc. will ship direct to your customer in your territory at no additional charge. Please note that any freight charges incurred will be added to the invoice.

Returns

If parts need to be returned to Mobile Products Inc., prior approval must be obtained. Issuance of a Return Goods Authorization (RGA) must be done to permit acceptance of returned shipments. All returns must be shipped prepaid freight and may be subject to a restocking fee. Parts shipped in error may be returned for full credit if Mobile Products, Inc. is notified of the error within 5 working days of receipt. Please note that an RGA will be required for returns of erroneous shipments. A copy of the RGA must be included with returned parts.

Additional Manuals

The following technical manuals for your product are available for order from LayMor. Use the parts ordering information above to order copies of these manuals.

Sweepmaster 300 Parts & Service Manual (This manual) 9107139

Sweepmaster 300 Operator Manual 376194

Brushes and Filters Quick Reference

6-3/8” Wafers and Combo Boxes

P/N	Description
9100458	6-3/8” x 24” Convoluted Poly
477996	6-3/8” x 24” Convoluted Combo
9101467	6-3/8” x 24” Convoluted Wire
478077	6-3/8” x 24” Flat Poly (Spacer Req’d)
478078	6-3/8” x 24” Flat Wire (Spacer Req’d)
478071	6-3/8” x 21” Convoluted Poly
478156	6-3/8” x 21” Convoluted Combo
478072	6-3/8” x 21” Convoluted Wire
478140	6-3/8” x 21” Flat Poly (Spacer Req’d)
478152	6-3/8” x 21” Flat Wire (Spacer Req’d)
478079	6” Spacer
91004588BX	6-3/8” x 24” Convoluted Poly Box of 25
477886BX	6-3/8” x 24” Convoluted Combo Box of 24
9101467BX	6-3/8” x 24” Convoluted Wire Box of 24
478077BX	6-3/8” x 24” Flat Poly Box of 30
478078BX	6-3/8” x 24” Flat Wire Box of 30
478071BX	6-3/8” x 21” Convoluted Poly Box of 30
478156BX	6-3/8” x 21” Convoluted Combo Box of 30
478072BX	6-3/8” x 21” Convoluted Wire Box of 30
478140BX	6-3/8” x 21” Flat Poly Box of 35
478152BX	6-3/8” x 21” Flat Wire Box of 35

Complete Brush Kits

P/N	Description
9104403K	6-3/8” x 24” 6’ Wide Convoluted Poly
9104641K	6-3/8” x 24” 6’ Wide 1/2 Poly 1/2 Wire Convoluted
9103150K	6-3/8” x 24” 6’ Wide Combo Convoluted
9104404K	6-3/8” x 24” 6’ Wide Wire Convoluted
9104644K	6-3/8” x 24” 6’ Wide Poly Flat (includes spacers)
9104639K	6-3/8” x 21” 6’ Wide 1/2 Poly 1/2 Wire Flat (includes spacers)
9104650K	6-3/8” x 21” 6’ Wide Wire Flat (includes spacers)
9104405K	6-3/8” x 24” 8’ Wide Convoluted Poly
9104642K	6-3/8” x 24” 8’ Wide 1/2 Poly 1/2 Wire Convoluted
9103151K	6-3/8” x 24” 8’ Wide Combo Convoluted
9104406K	6-3/8” x 24” 8’ Wide Wire Convoluted
9104651K	6-3/8” x 24” 8’ Wide Poly Flat (includes spacers)
9104654K	6-3/8” x 21” 8’ Wide 1/2 Poly 1/2 Wire Flat (includes spacers)
9104659K	6-3/8” x 21” 8’ Wide Wire Flat (includes spacers)

Brushes and Filters Quick Reference - Cont.

Filters List

Item	P/N	Description	Qty
1	476092	Engine Oil	1
2	476094	Primary Fuel	1
3	9101624	Fuel Filter (in-line)	1
4	9101798	Filter, Hydraulic (spin-on)	2
5	9107085	Filter, Hydraulic high pressure	1
6	9107145	O-ring, high pressure	1
7	467498	Air Cleaner Primary	1
8	467506	Safety Air Cleaner	1

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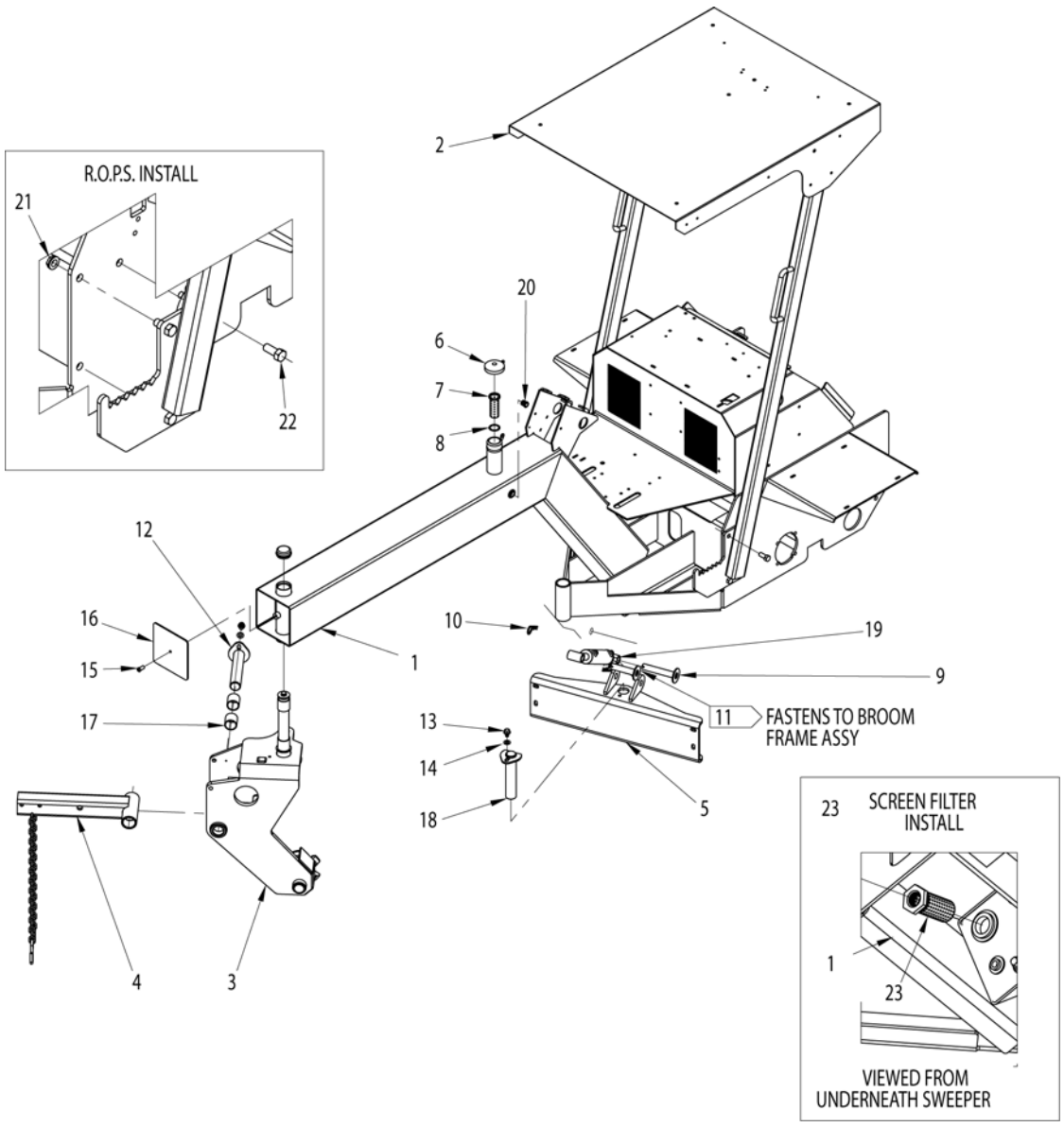
Figure 1-1. Frame Assembly



Item	P/N	Description	Qty
	374421	**Frame Assembly**	1
1	100074	Weldment, Frame (6HC/8HC)	1
2	100088	ROPS Canopy - 6HC/8HC	1
3	376000	Assembly, Front Wheel - 6HC/8HC	1
4	376087	Tow Bar	1
5	376160	Broom Mount	1
6	439182	Filler Cap	1
7	447979	Hydraulic Tank Screen	1
8	9104574	Washer	1
9	100113	Pin	1
10	015768	Cotter Pin	"2
11	100115	Pin	1
12	376509	Pin, Tow Bar	1
13	441758	Bolt	2
14	011325	Washer	2
15	472936	Capscrew	1
16	376252	Cover, Front Frame Tube	1
17	V63023100	Bushing	2
18	377028	Pin	1
19	376641	Cylinder, Broom Lift	1
20	9101942	Fitting, Sight Gauge	1
21	406231	Locknut	6
22	012039	Bolt	6
23	9100143	Hydraulic Tank Filter Screen	1

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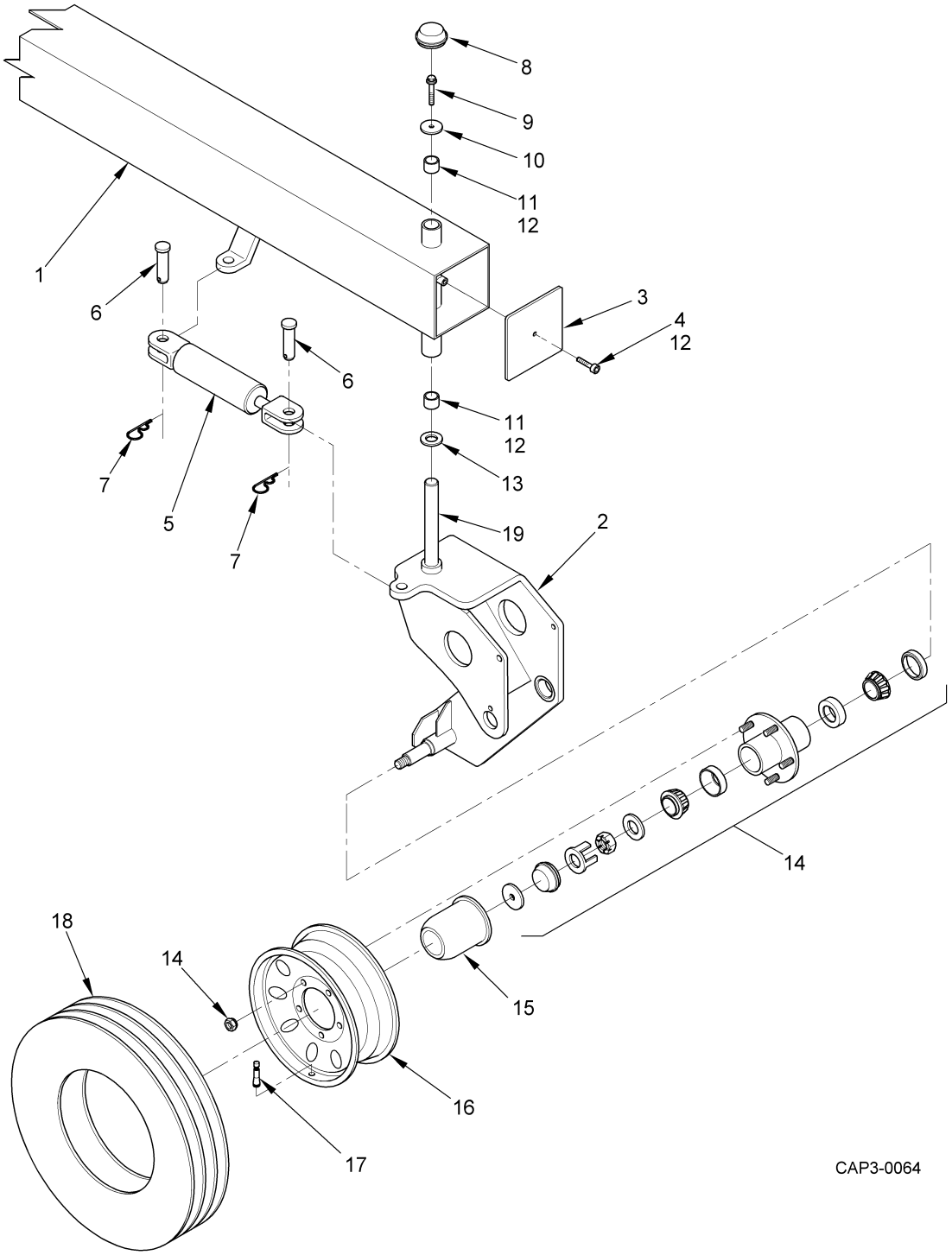
Figure 1-2. Fork Assembly



Item	P/N	Description	Qty
		Fork Assembly	
1	376376	Weldment, Frame	1
2	376005	Weldment, Front Fork	1
3	376252	Cover, Frame Tube	1
4	472936	Capscrew	1
5	467977	Cylinder, Steering	1
6	9103034	Pin, Clevis	2
7	015768	Cotter Pin	2
8	440487	Cap, Dust	1
9	441766	Capscrew	1
10	459842	Washer, Pin Retainer	1
11	V63023100	Bushing	2
12	047506	Loctite, Red #271	A/R
13	376327	Thrust Washer	2
14	421105	Kit, Hub/Spindle - Grease	1
	375985	* Hub Seal	1
	375986	* Hub Bearing	2
	375987	* Bearing Race	2
	375988	* Hub, with Studs	1
	375989	* Stud	5
	375990	* Stud	5
	047480	* Hex Nut	5
	375992	* Washer	1
	375993	* Nut Spindle	1
	375994	* Retainer	1
	375995	* Cap, Grease	1
	375996	* Plug, Grease Cap	1
	031401	* Grease Zirk	1
15	472639	Cover, Dust Cap - Cosmetic	1
16	9104564	Rim, Wheel	1
17	029629	Stem, Valve	1
18	9104606	Tire P20575R14 (Not available for resale)	1
19	375974	Pin, Front Fork	1

* Included with 421105 Hub Kit

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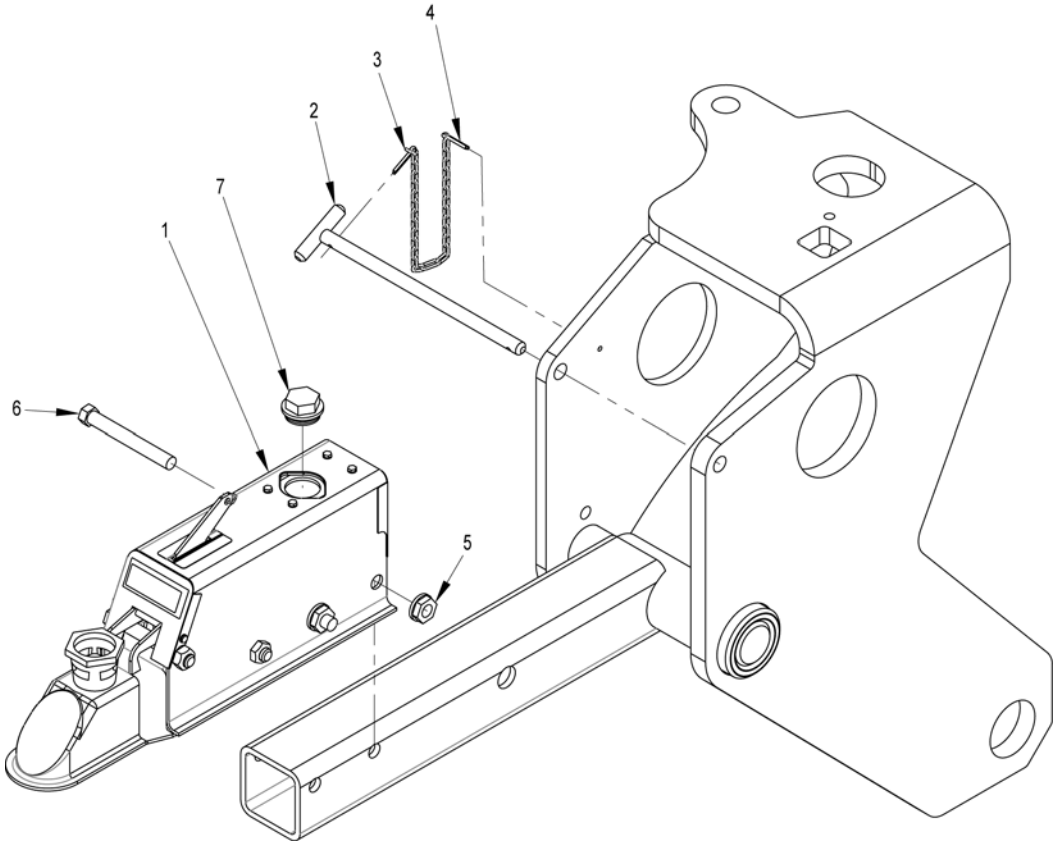
Figure 1-3. Tow Hitch Assembly (Optional)



Item	P/N	Description	Qty
	374728	**Tow Hitch Assembly**	
1	447995	Surge Brake Actuator	1
2	377135	Pin	1
3	426627	Chain	1
4	015131	Cotter Pin	2
5	440644	Locknut	2
6	011460	Bolt	2
7	374009	Cap, Master Cylinder	1

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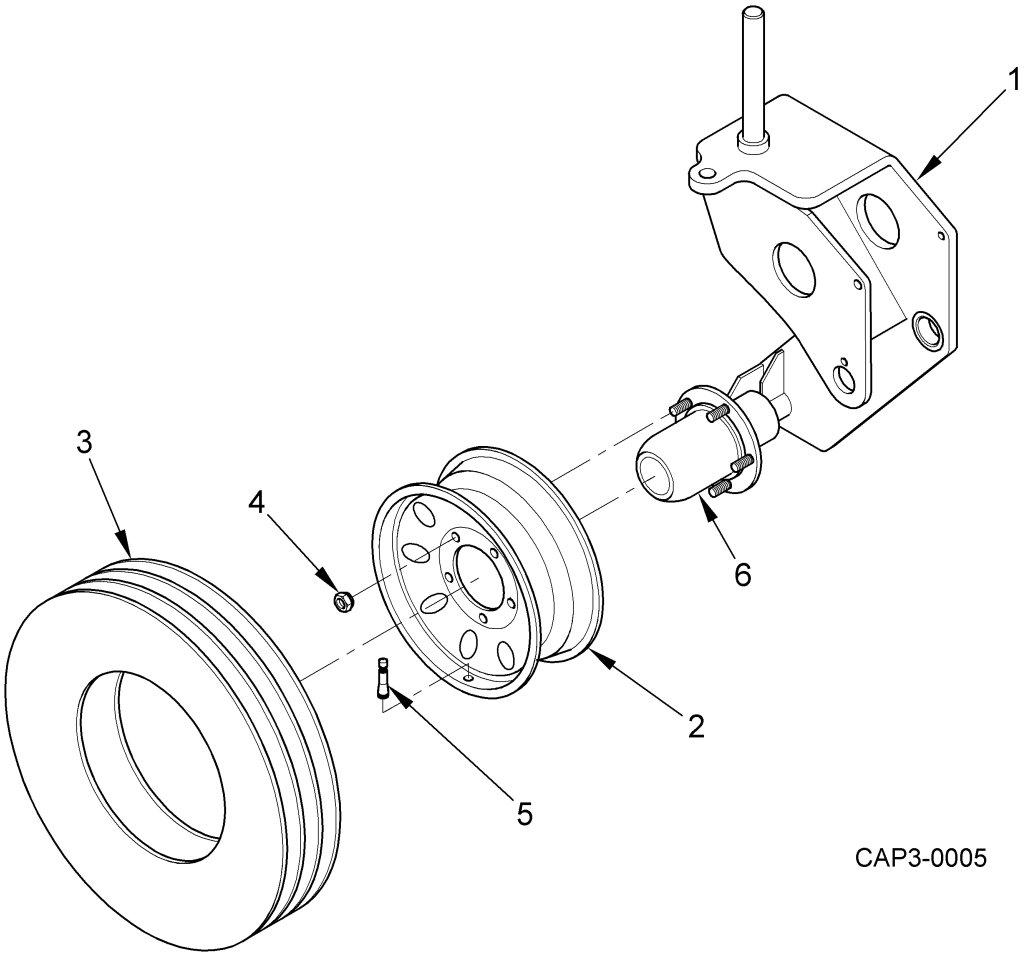
Figure 1-4. Tire Wheel and Lug Nut Assembly



Item	P/N	Description	Qty
	374694	**Tire Wheel & Lug Nut Assembly**	
1	376005	Assembly, Fork	1
2	9104564	Rim, Wheel	3
3	9104606	Tire, P20575R14 (Not Available for resale)	3
4	047480	Hex Nut, Lug	15
5	029629	Stem, Valve	3
6	472639	Cover, Dust Cap	1

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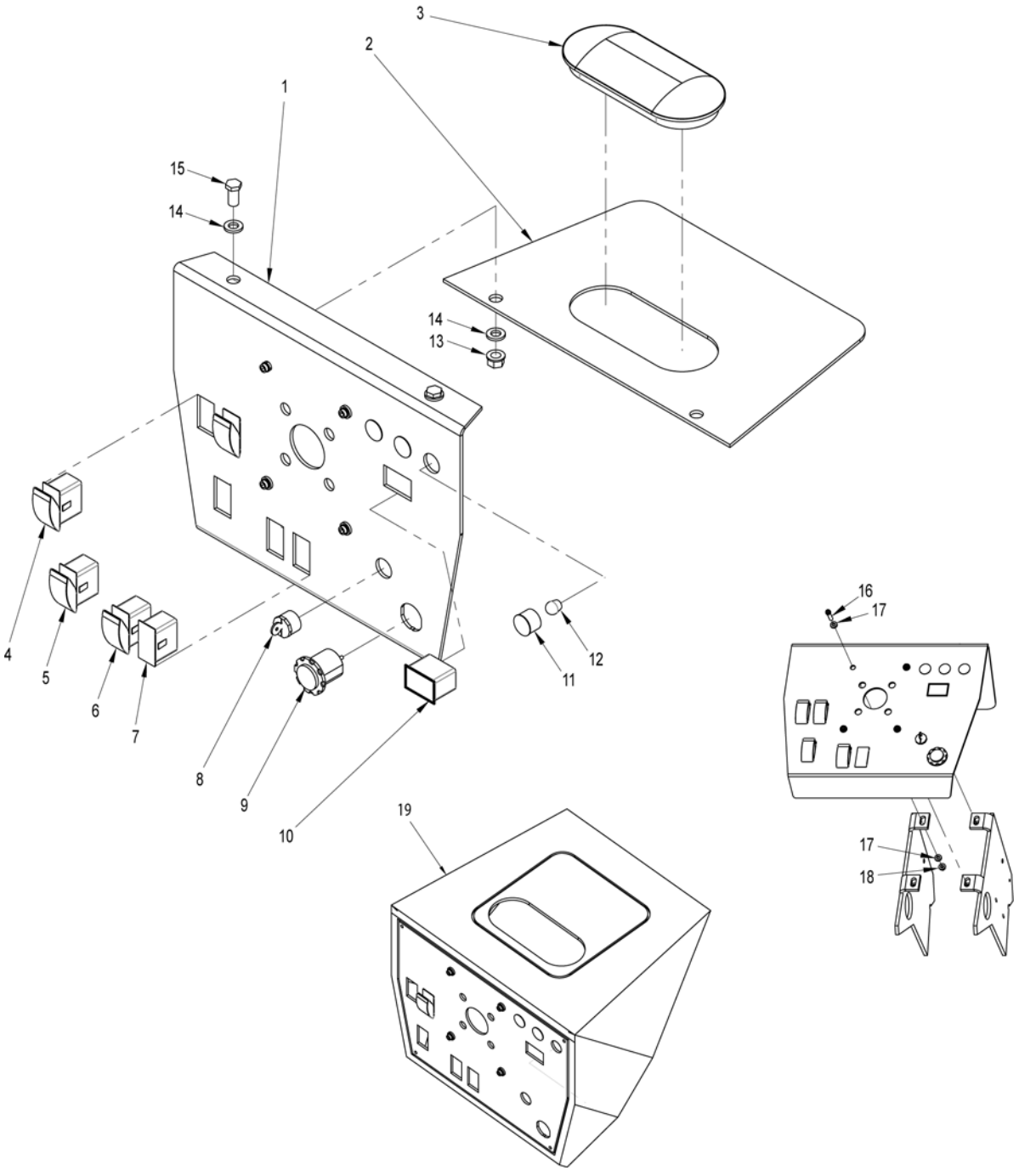
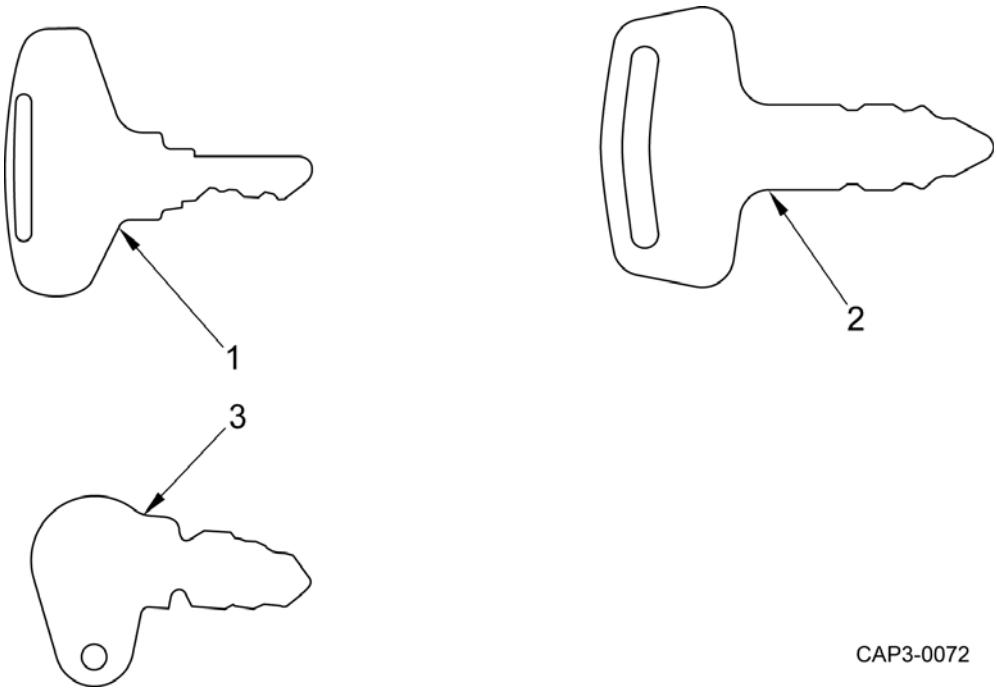
Figure 1-5. Dash Assembly



Item	P/N	Description	Qty
		Dash Assembly	
1	100091	Dash Panel	1
2	100106	Rear Dash Panel	1
3	446229	Light	1
4	100135	Switch, 3 Position Momentary	2
5	100136	Switch, ON/OFF	1
6	460113	Switch, Sprinkler	1
7	500983	Plug	1
8	9101497	Ingnition Switch	1
9	9102266	Throttle Handle And Cable Assembly	1
10	460485	Hourmeter	1
11	047448	Indicator Lamp	3
12	060624	Bulb	3
13	441477	Nut	2
14	011323	Washer	4
15	441659	Bolt	2
16	441568	Capscrew	4
17	011321	Washer	8
18	440636	Locknut	4
19	100238	Dash Cover	1

PARTS LIST

Figure 1-6. Ignition Key Identification



Item	P/N	Description	Qty
1	9101528	Key Only - Kubota Engine	1
	9101497	Ignition Switch with Keys - Kubota Engine	1
2	468090	Key Only - Kubota Engine	1
	468082	Ignition Switch with Keys - Kubota Engine	1
3	468084	Key Only - Kubota Engine (Sunbelt only)	1
	468083	Ignition Switch with Keys - Kubota Engine (Sunbelt only)	1

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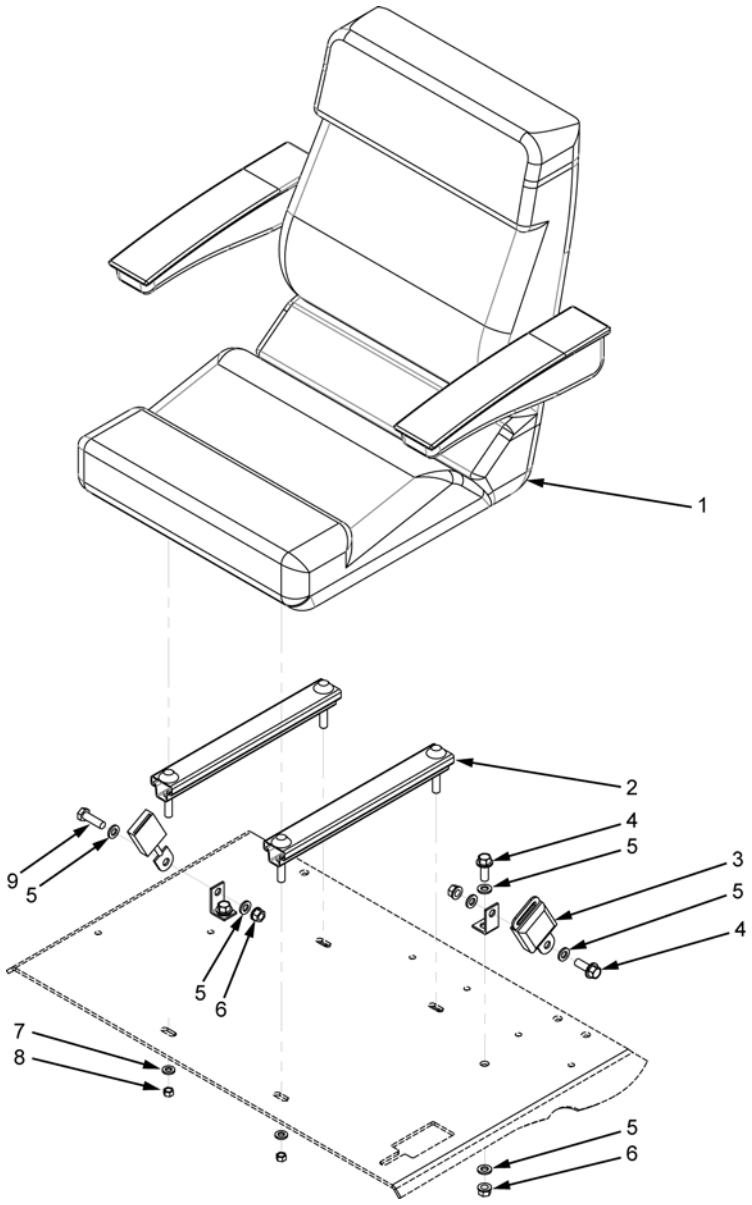
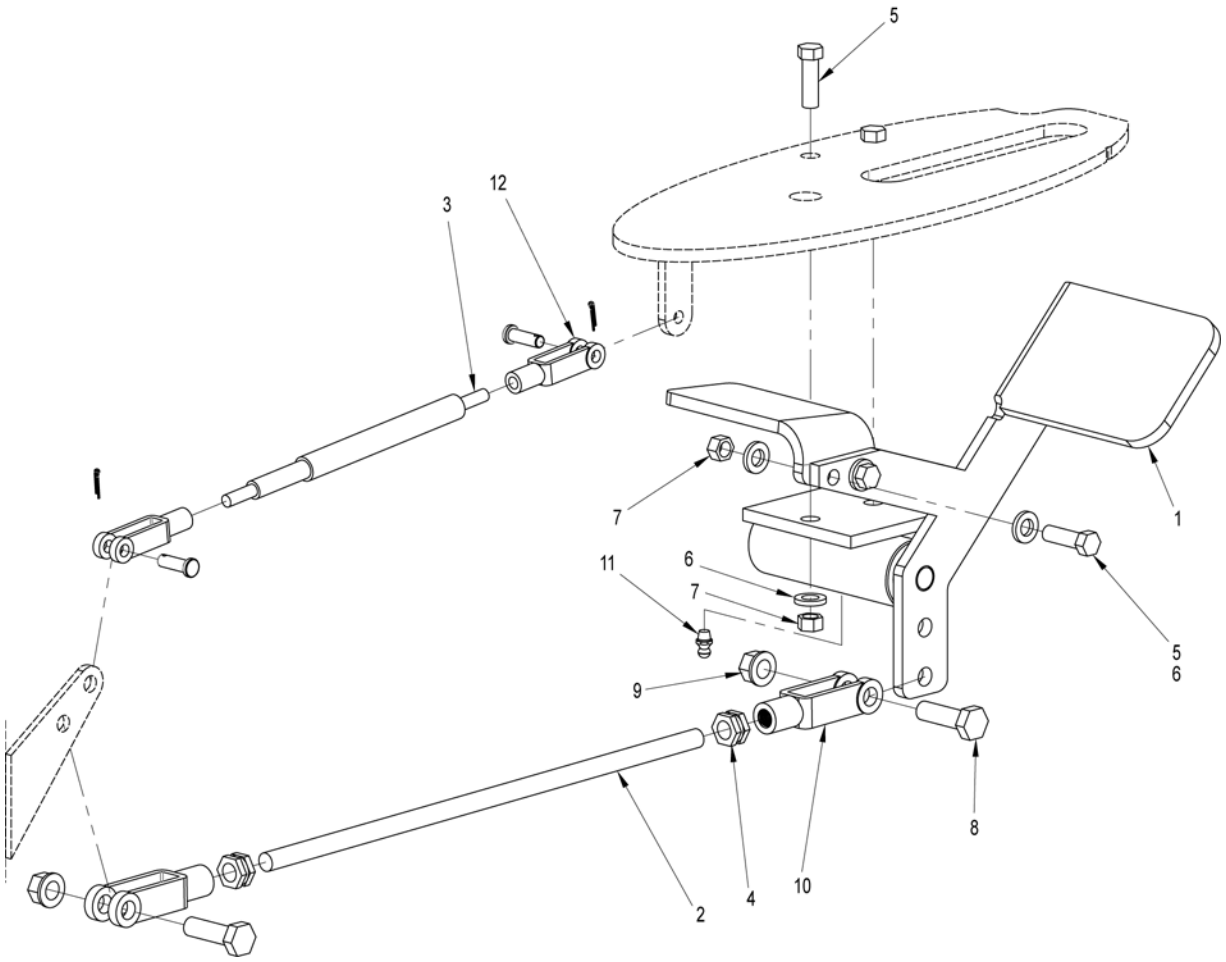
Figure 1-7. Seat Assembly



Item	P/N	Description	Qty
	472689	**Seat Assembly**	
1	472688	Seat	1
2	035519	Seat Slide Adjuster Assembly	1
3	458778	Seat Belt Kit	1
4	413856	Bolt	3
5	011323	Washer	8
6	441477	Nut	4
7	011322	Washer	4
8	083493	Locknut	4
9	083527	Bolt	

PARTS LIST

Figure 1-8. Speed Pedal Linkage Assembly



Item	P/N	Description	Qty
	100240	**Speed Pedal Linkage Assembly**	
1	100104	Variable Speed Pedal (See Figure 1-12 for breakdown.	1
2		Threaded Rod	1
3		Pedal Return Actuator	1
4	V23504500	Nut	2
5	441600	Bolt	4
6	011322	Washer	6
7	083493	Nut	1
8	083527	Bolt	1
9	441477	Nut	2
10	031930	Clevis Rod End	1
11	031401	Lube Fitting	1
12	6071K410	Forged Clevis Rod End (Includes Pin And Cotter Pin)	2

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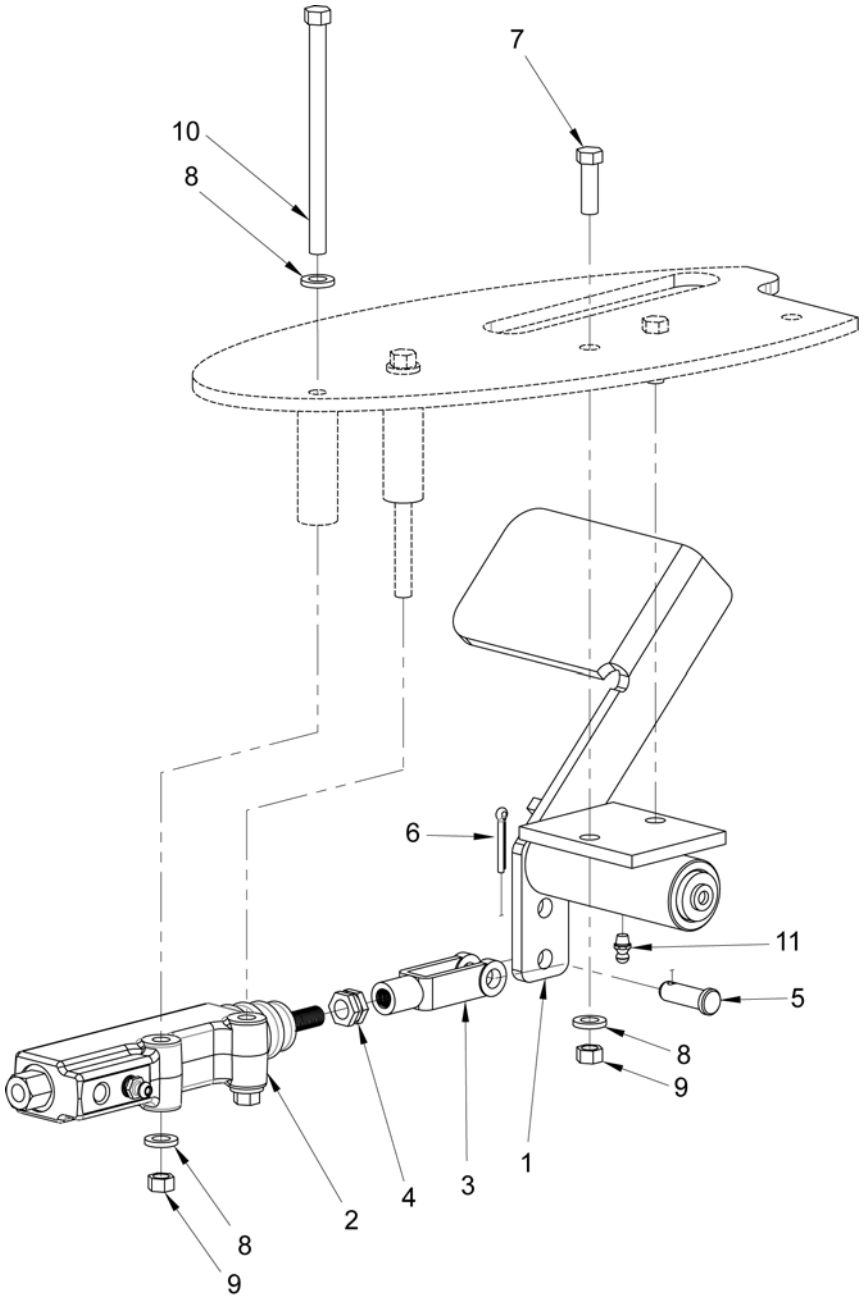
Figure 1-9. Brake Pedal Assembly



Item	P/N	Description	Qty
	100241	**Brake Pedal Assembly**	
1	100084	Brake Pedal	1
2	100086	Master cylinder assembly	1
3	031930	Clevis	1
4	V23404500	Nut	1
5	025676	Clevis pin	1
6	015131	Cotter pin	1
7	441600	Bolt	2
8	011322	Washer	6
9	083493	Nut	4
10	010478	Bolt	2
11	031401	Lube fitting	1

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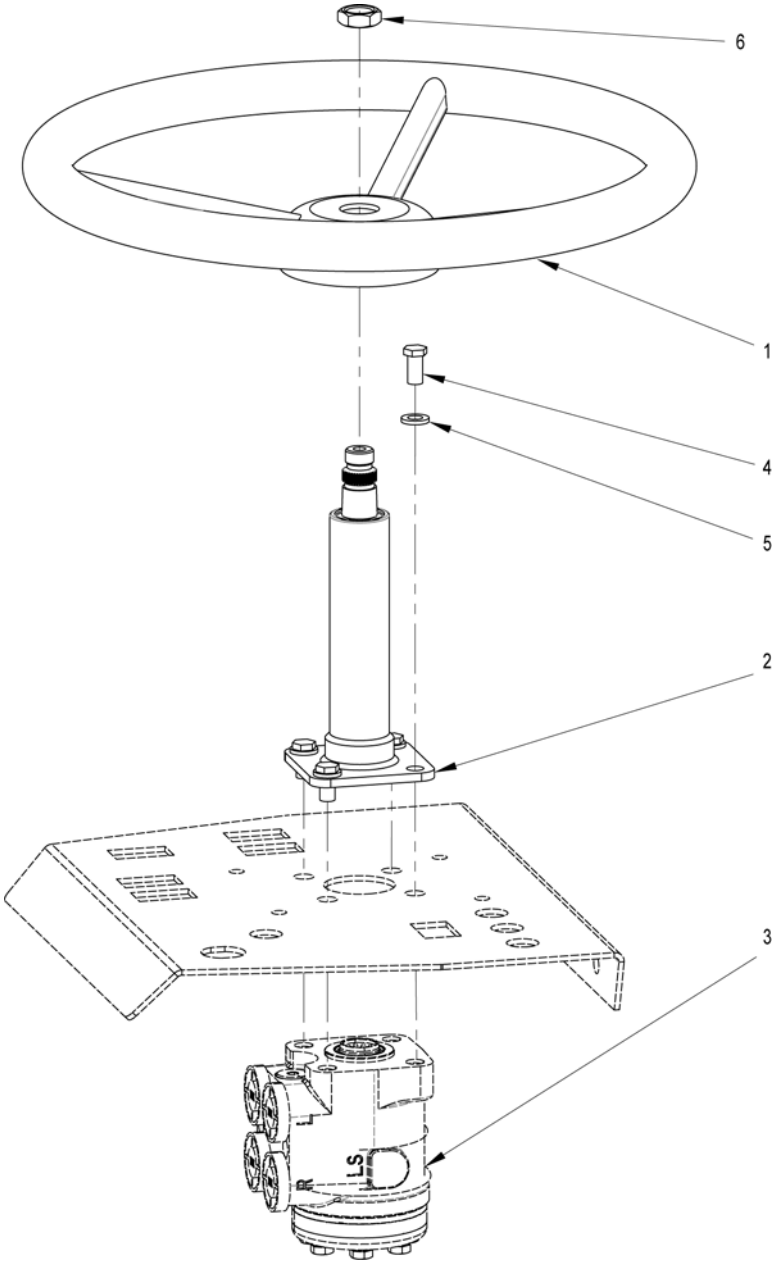
Figure 1-10. Steering Assembly



Item	P/N	Description	Qty
	100242	**Steering Assembly**	
1	100094	Steering Wheel	1
2	100097	Steering Column Assembly	1
3	100092	Steering Orbital (See Section 3)	1
4	441659	Bolt	4
5	011323	Washer	4
6	9107146	Nut (Supplied With Item 2)	1
7	467563	Cover	1

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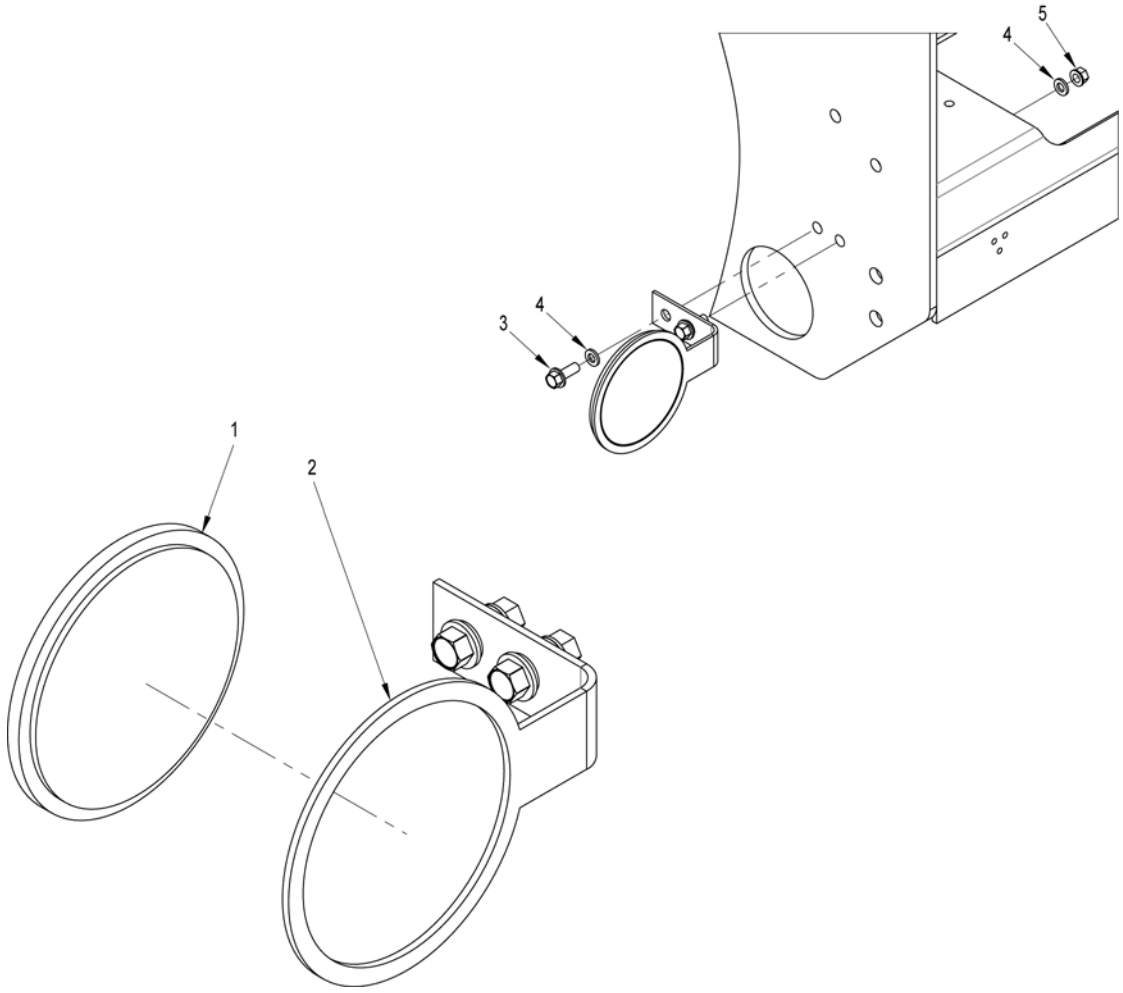
Figure 1-11. Tail Light Mount



Item	P/N	Description	Qty
	100244	**Tail Light Bracket**	
1	100134	Tail Light (See Figure 4-2 for breakdown.)	2
2	100107	Bracket	2
3	413856	Bolt	4
4	011323	Washer	4
5	441477	Nut	4

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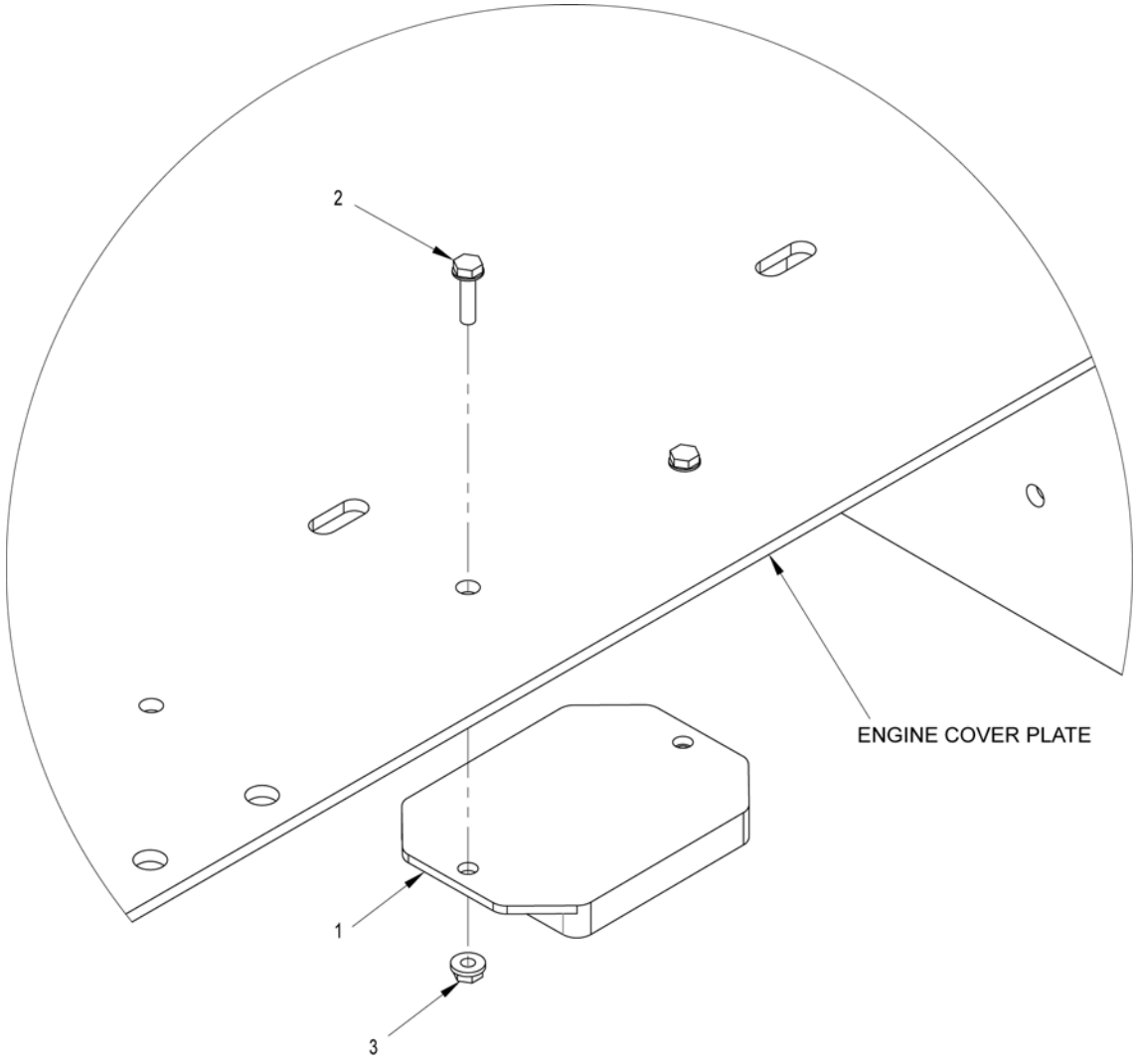
Figure 1-12. Engine Protection Module



Item	P/N	Description	Qty
	374967	**Engine Protection Module**	
1	465229	Engine Protection System Module	1
2	441527	Bolt	2
3	440628	Nut	2

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Figure 2-1. Hydraulic System Hoses and Fittings

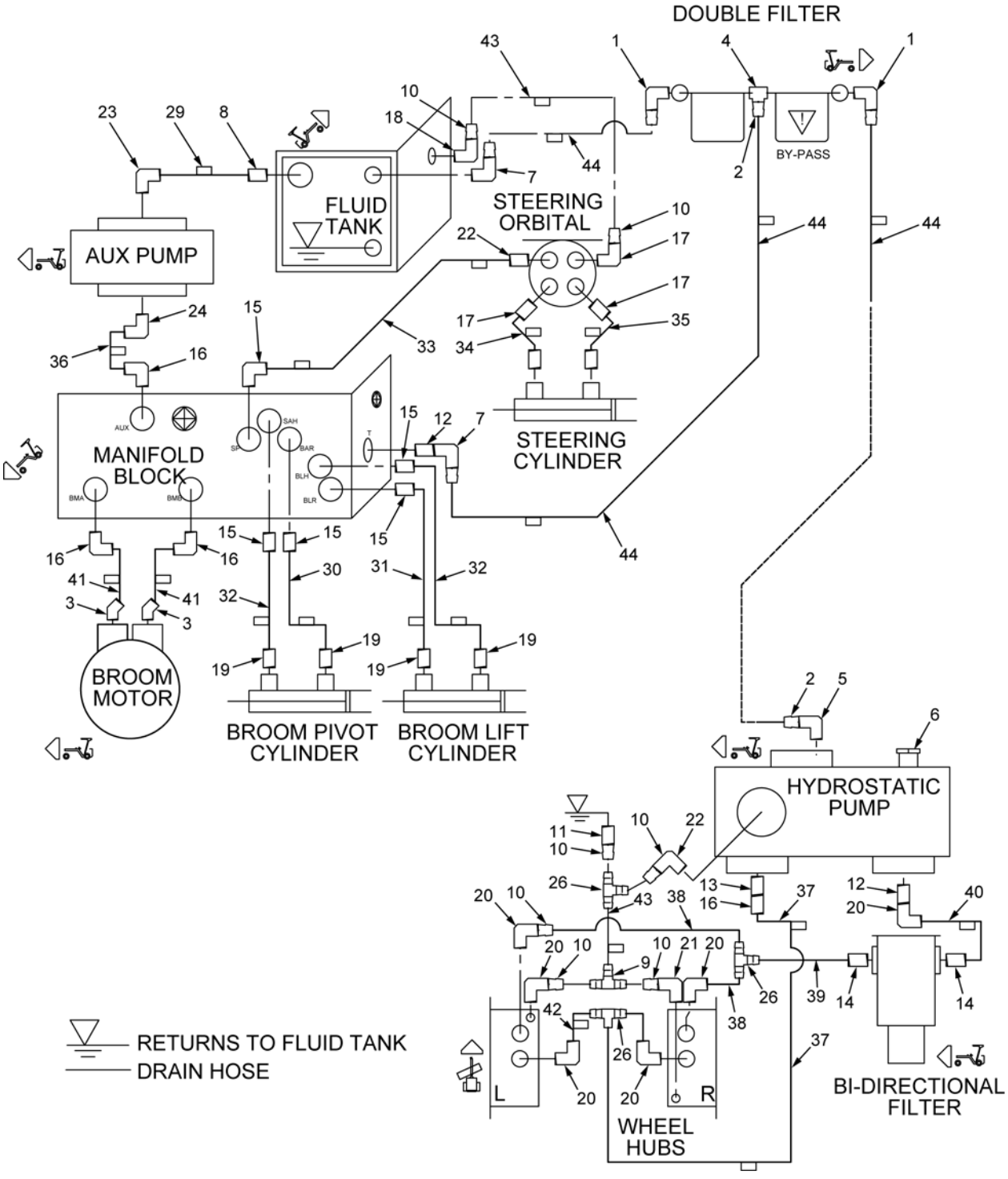
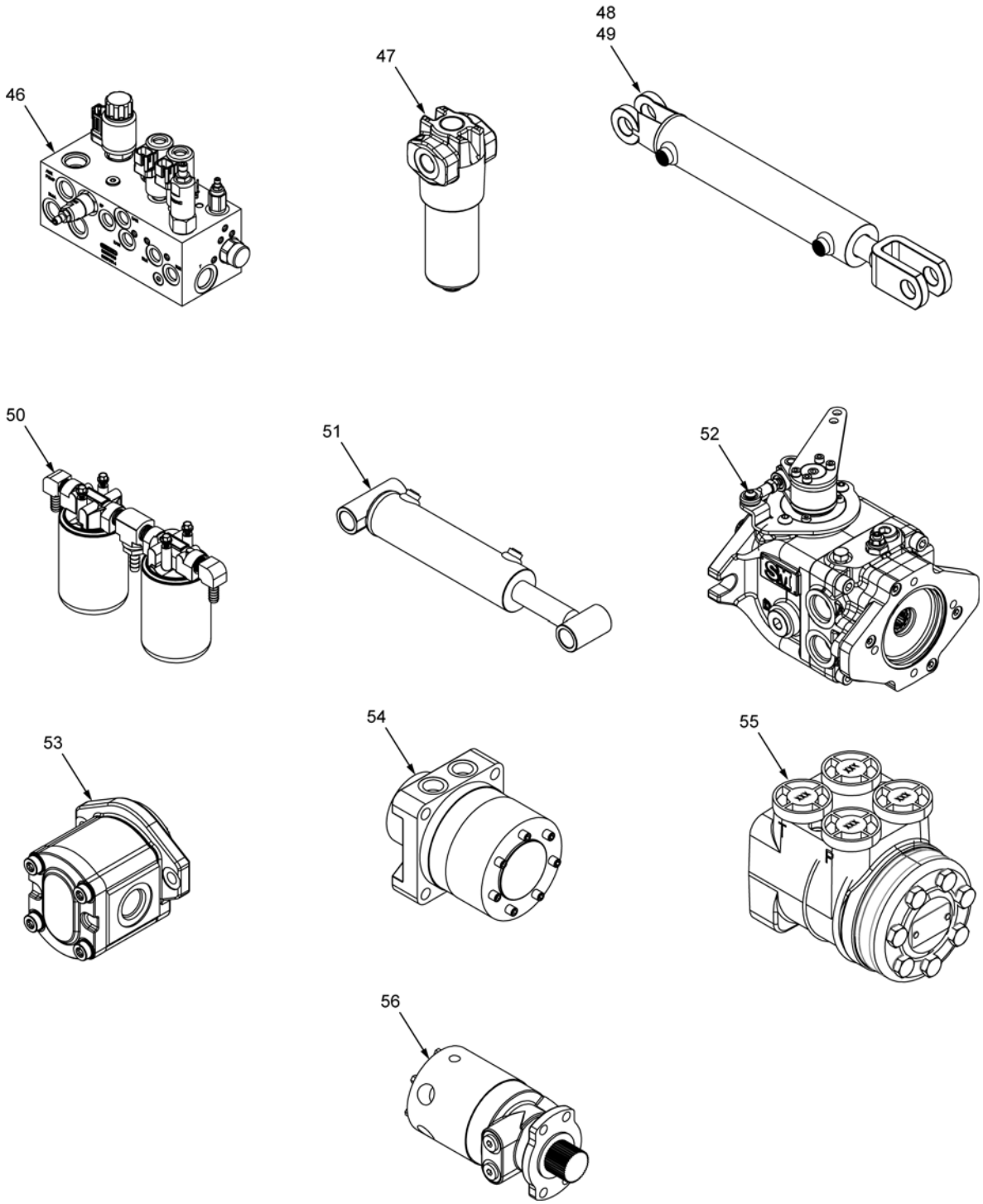


Figure 2-1. Hydraulic System Hoses and Fittings (Cont.)

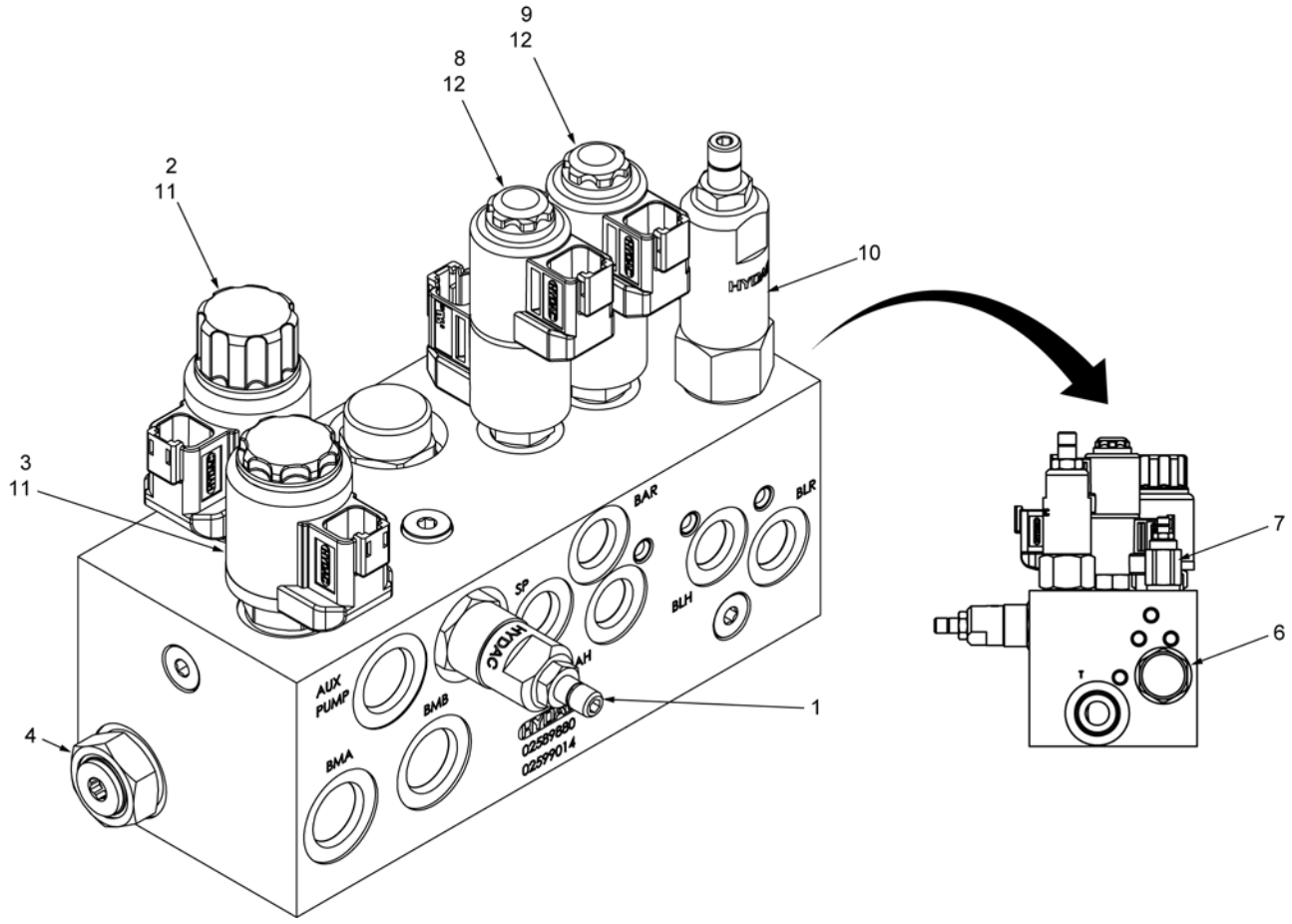


Item	P/N	Description	Qty
		Hydraulic System Hoses and Fittings	
1	467613	Hose Barb, 90°	2
2	467621	Hose Barb	2
3	477647	Elbow, 45°	2
4	467605	Tee	1
5	9107127	Elbow	1
6	406819	Plug	6
7	447094	Boss/Barb, 90°	2
8	No Number	Male Connector	1
9	447128	Tee	1
10	447219	Fitting	6
11	425348	Elbow, 45°	1
12	9107128	Reducer	1
13	9107126	Reducer	1
14	No Number	Connector	2
15	477637	Connector	5
16	477634	Connector	4
17	093427	Connector	3
18	092825	Elbow, 90°	1
19	477639	Elbow, 90°	4
20	477632	Elbow, 90°	5
21	406645	Elbow, 90°	2
22	V63143600	Elbow, 90°	2
23	386643	Elbow, 90°	1
24	No Number	Elbow, 90°	1
25	092965	Elbow, swivel nut, 90°	1
26	477633	Tee, swivel nut	2
27	386643	Elbow, 90°	1
28	No Number	Elbow, 90°	1
29	9107097	Hose Assembly, 15.50 inch	1
30	9107115	Hose Assembly, 15.50 inch	1
31	9107116	Hose Assembly, 16.25 inch	1
32	9107117	Hose Assembly, 33.5 inch	1
33	9107118	Hose Assembly, 35.00 inch	1
34	9107119	Hose Assembly, 57.00 inch	1
35	377416	Hose Assembly, 57.50 inch	1
36	377408	Hose Assembly, 67 inch	1
37	9107120	Hose Assembly, 16.75 inch	1
38	9107121	Hose Assembly, 16.25 inch	1
39	9107122	Hose Assembly, 15.25 inch	2
40	9107123	Hose Assembly, 16.75 inch	1
41	9107124	Hose Assembly, 17.75 inch	1
42	9107125	Hose Assembly, 120.50 inch	2
43	377382	Hose Assembly, 47.00 inch	1
44	447474	Hydraulic Hose Line, Bulk, 3/8-inch	AR
45	446948	Hydraulic Hose Line, Bulk, 1/2-inch	AR
46	100064	Manifold Block (See Figure 2-2 for breakdown)	
47	100101	Filter Assembly, High Pressure (See Figure 2-8 for breakdown)	1
48	467986	Cylinder, Broom Swing (See Figure 2-12 for breakdown)	1
49	467978	Cylinder, Steering (See Figure 2-10 for breakdown)	1

Item	P/N	Description	Qty
50	376442	Filter Assembly, Low Pressure (See Figure 2-9 for breakdown)	1
51	376641	Cylinder, Broom Lift (See Figure 2-11 for breakdown)	1
52	100065	Piston Pump, Hydrostatic (See Figure 2-6 for breakdown)	1
53	9104033	Pump, Auxiliary (See Figure 2-7 for breakdown)	1
54	473464	Motor, Broom Drive (See Figure 2-5 for breakdown)	1
55	100092	Steering Orbital	1
56	9103730	Motor, Wheel Drive (See Figure 2-4 for breakdown)	2

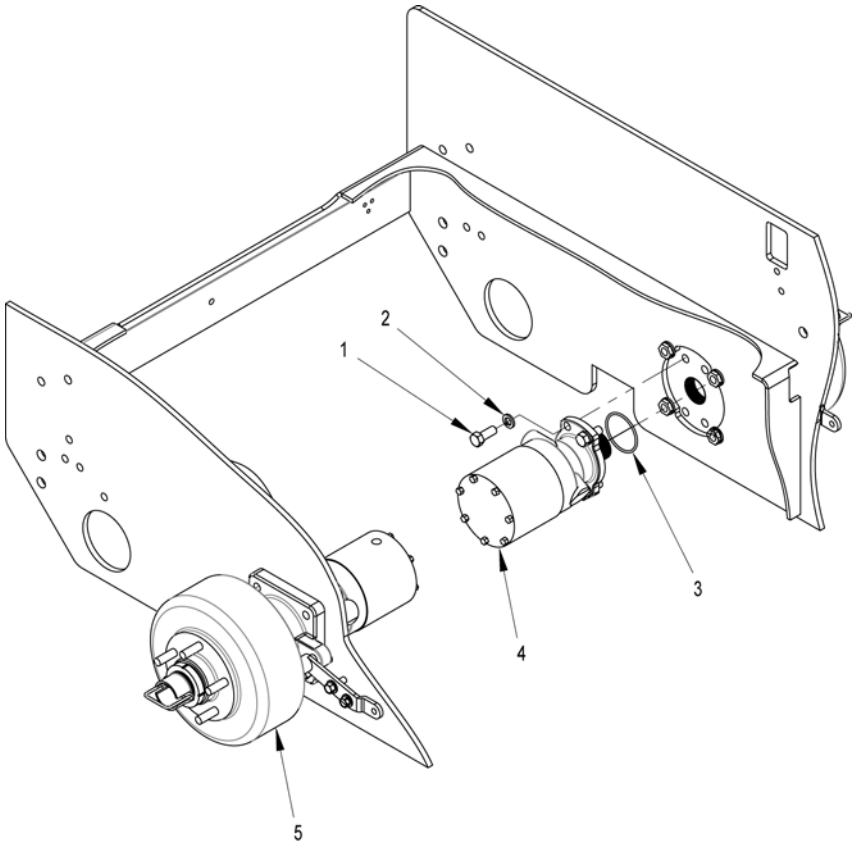
PARTS LIST

Figure 2-2. Manifold Block



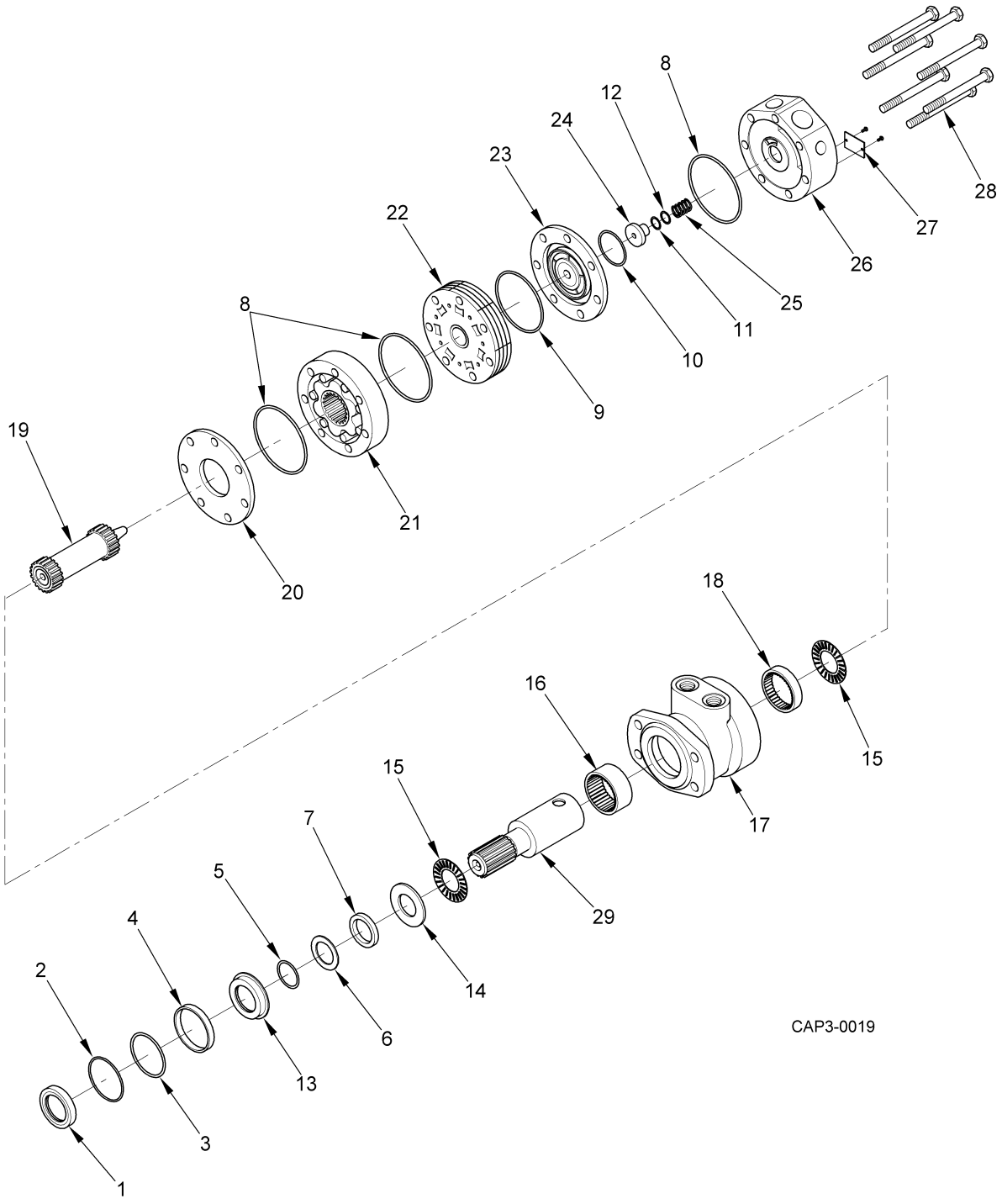
Item	P/N	Description	Qty
	100064	**Manifold Block**	1
1	9107072	Relief Valve, Broom Motor	1
2	9107073	Valve, Solenoid Cartridge	1
3	9107074	Valve, Solenoid Cartridge	1
4	9107075	Valve, Check	1
5	9107076	Valve, Flow Control (3 GPM)	1
6	9107077	Valve, Flow Control (1 GPM)	1
7	9107078	Valve, Pressure Relief	1
8	9107079	Valve, Solenoid Cartridge, Swing	1
9	9107080	Valve, Solenoid Cartridge, Lift	1
10	9107081	Valve, Check	1
11	9107082	Coils, Solenoid	2
12	9107083	Coils, Solenoid	4

Figure 2-3. Wheel Drive Motors



Item	P/N	Description	Qty
	9103730	**Wheel Drive Motors**	
1	056879	Bolt	4
2	011643	Washer	4
3	9101452	O-Ring	1
4	9103730	Drive Motor	2
5	9104349	Hydraulic Disconnect w/Brake Hub (See Figure 3-3 for breakdown)	2

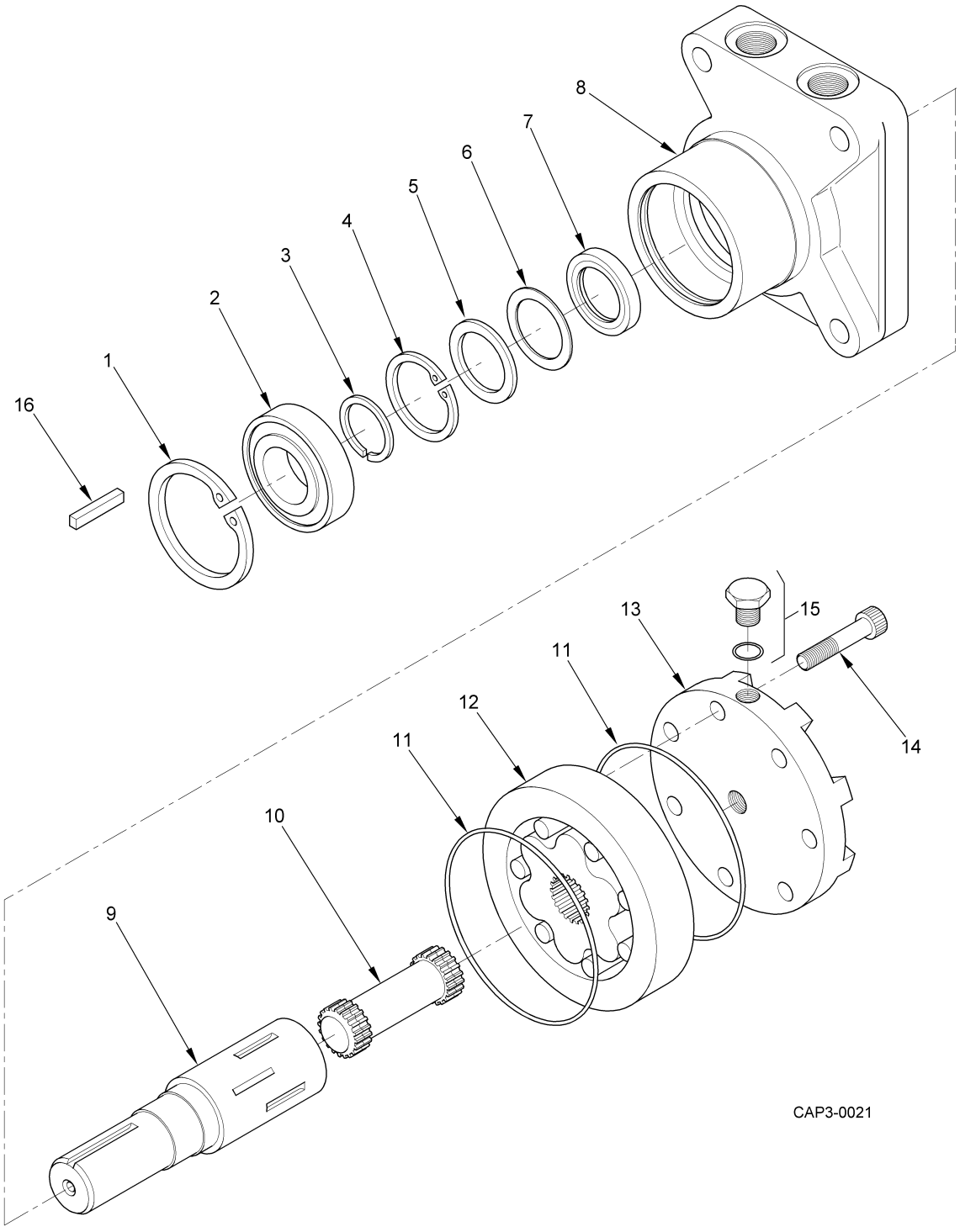
Figure 2-4. Wheel Drive Motor Assembly



Item	P/N	Description	Qty
	9103730	**Wheel Drive Motor Assembly**	
	9101638	Kit, Seal 500 - RE (See I.D. Tag, Item 27)	1
	511607	Kit, Seal 600 - DR (See I.D. Tag, Item 27)	1
1		* Seal Dust	1
2		* Ring, Wire	1
3		* Shim Backup	1
4		* Seal, Carrier	1
5		* Shim, Backup	1
6		* Seal, Teflon Backup	1
7		* Seal, Shaft	1
8		* Seal, Manifold	1
9		* Seal, Body	1
10		* Seal, Commutator	1
11		* Seal, O-Ring	1
12		* Seal, Teflon	1
13		* Seal, High Pressure	1
14		* Washer, Thrust	1
15	9104422	Bearing, Thrust (500 - RE)	2
	380788	Bearing, Thrust (600 - DR)	2
16		Bearing, Front Thrust	1
17		Housing (500 - RE)	1
		Housing (600 - DR)	1
18		Bearing, Rear Shaft	1
19	452771	Link, Drive (500 - RE)	1
	380789	Link, Drive (600 - DR)	1
20		Plate, Wear	1
21		Rotor Set	1
22		Manifold	1
23		Assembly, Commutator	1
24		Piston, End Cover	1
25		Spring, Piston	1
26		Cover, End	1
27		Tag, I.D.	1
28		Bolt	7
29	9104530	Shaft (500 - RE)	1
	409940	Shaft (600 - DR)	1

* Included with Seal Kits 9101638 and 511607

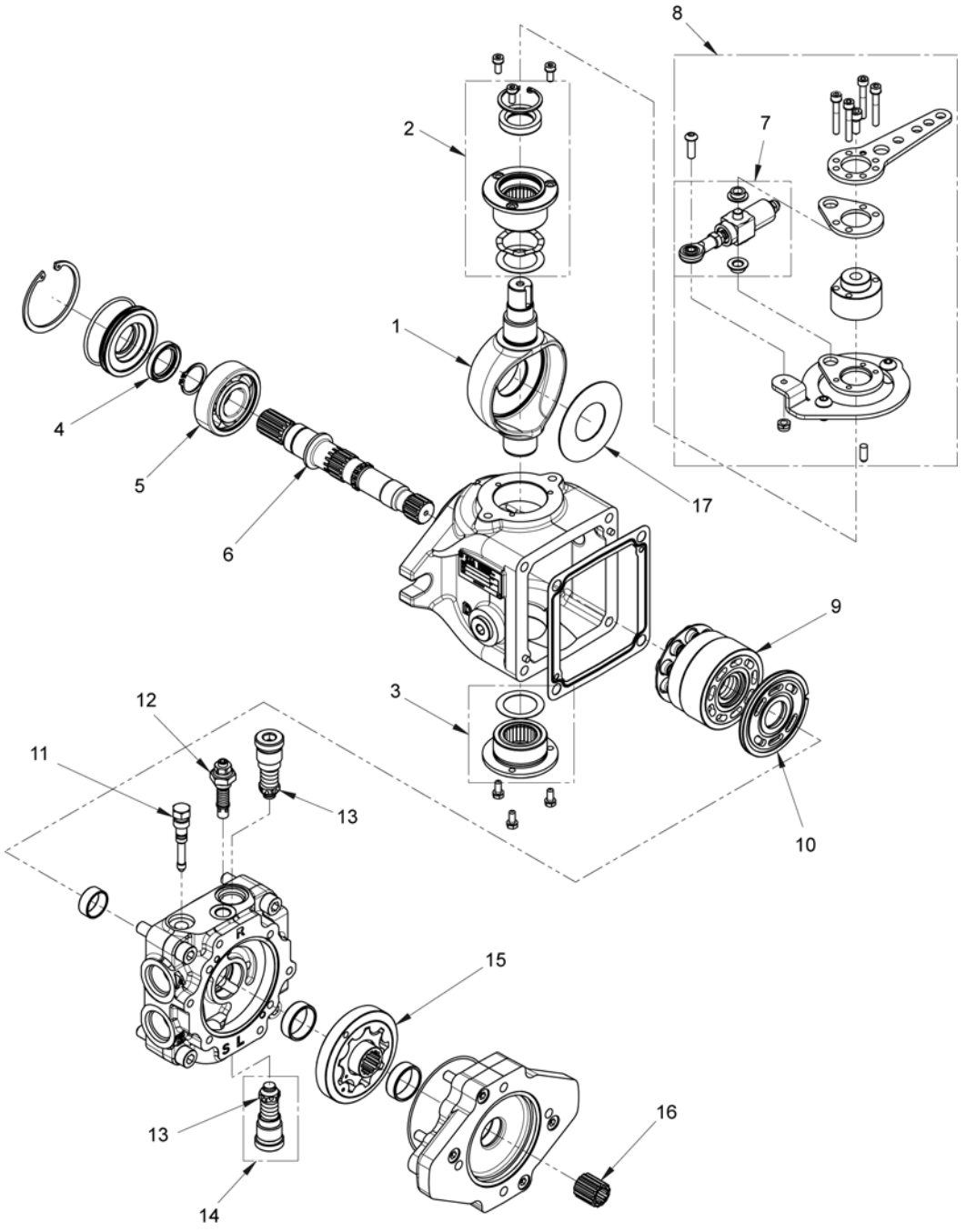
Figure 2-5. Hydraulic Broom Motor Assembly



Item	P/N	Description	Qty
	473464	**Hydraulic Broom Motor Assembly**	
	9107094	Kit, Seal	1
1		* Ring, Retaining	1
2		* Bearing, Ball	1
3		* Ring, Retaining	1
4		* Ring, Retaining	1
5		* Washer	1
6		* Washer, Backup	1
7		* Seal Pressure	1
8		Housing (Not available stand-alone - order complete motor)	1
9		Shaft, Output w/Internal Check Valve	1
		Poppet (Shaft Output)	1
10		Drive	1
11		* Seal	2
12		Gerotor	1
13		Cap, End (Not available stand-alone - order complete motor)	1
14		Capscrew, Internal Hex Hd.	7
15		Plug/O-Ring	1
16		Key, Straight	1

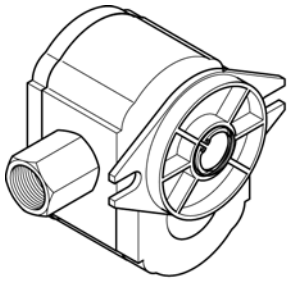
PARTS LIST

Figure 2-6. Piston Pump



Item	P/N	Description	Qty
	100065	**Piston Pump**	
1		Swashplate	1
2		Upper Flange With Bearing	1
3		Lower Cover Plate With Bearing	1
4		Shaft Seal Ring	1
5		Ball Bearing	1
6		Shaft	1
7		Tube With Standard Spring And Bushings	1
8	9107109	Zeroing Mechanical Assembly	1
9		Rotating Assembly	1
10		Valve Plate	1
11		By-Pass Screw Assembly	1
12	9107108	Charge Valve, Adjustable	1
13	9107107	Relief Valve	2
14	9107107	Relief Valve	2
15		Boost Pump Assembly	1
16		Reduction Sleeve	1
17		Swashplate Insert	
	9107096	Complete Gaskets Kit Including O-Rings And Sealing Rings (Not illustrated)	

Figure 2-7. Auxiliary Pump

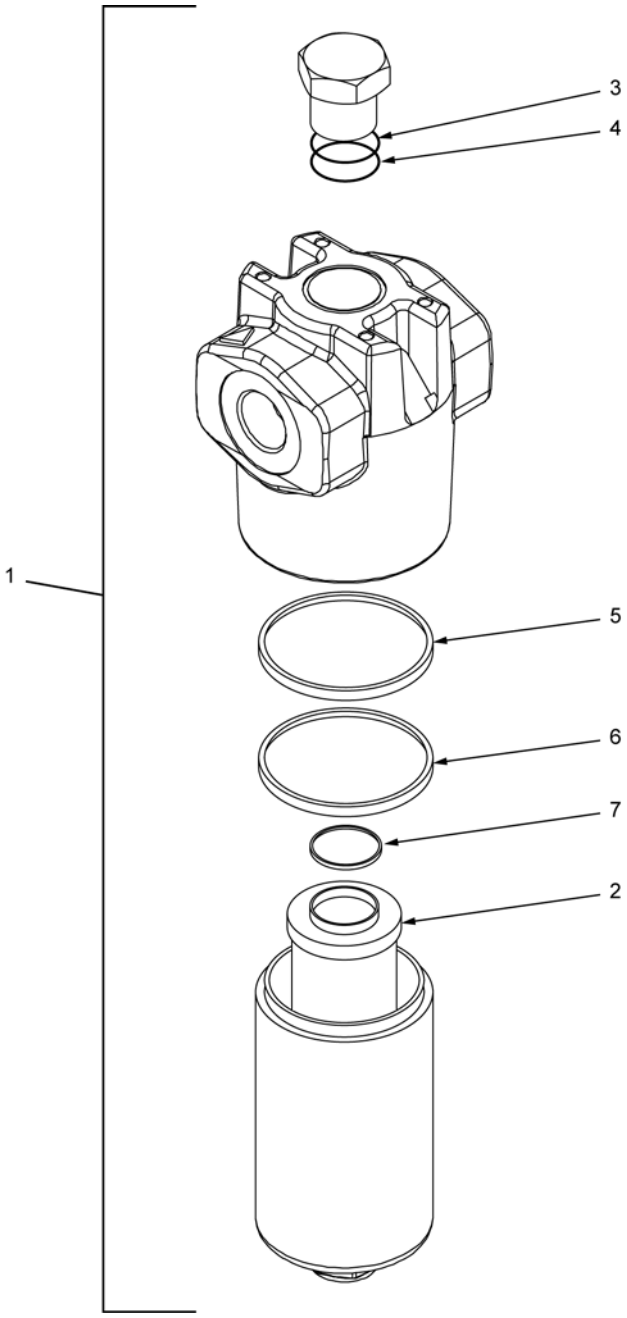


CAP3-0023

Item	P/N	Description	Qty
	9104033	**Auxiliary Pump**	
1	459693	Kit, Complete Seal (Not illustrated)	
		* Seal	2
		* O-Ring, 313	2
		* Shaft Seal, BAB 17.46 x 28.58”	2

PARTS LIST

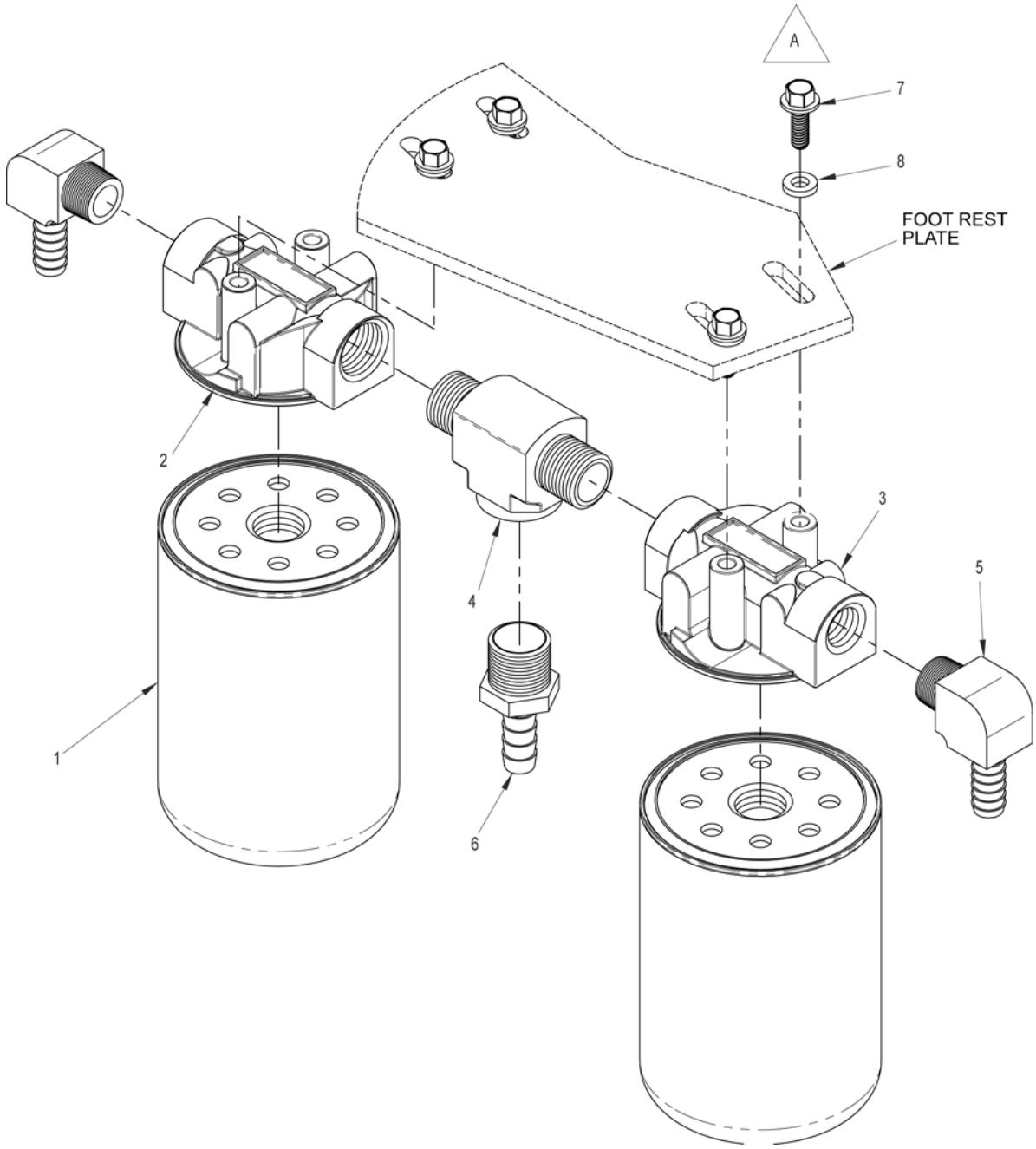
Figure 2-8. High Pressure Filter Assembly



Item	P/N	Description	Qty
		High Pressure Filter Assembly	
1		Filter Assembly	1
2	9107085	Filter Element	1
	01260990	Repair Kit (Consisting of the following Items)	
3		* Profile Seal Ring	1
4		* O-Ring, Indicator	1
5		* O-Ring, Bowl	1
6		* Backup Ring	1
7		* O-Ring, Element	1

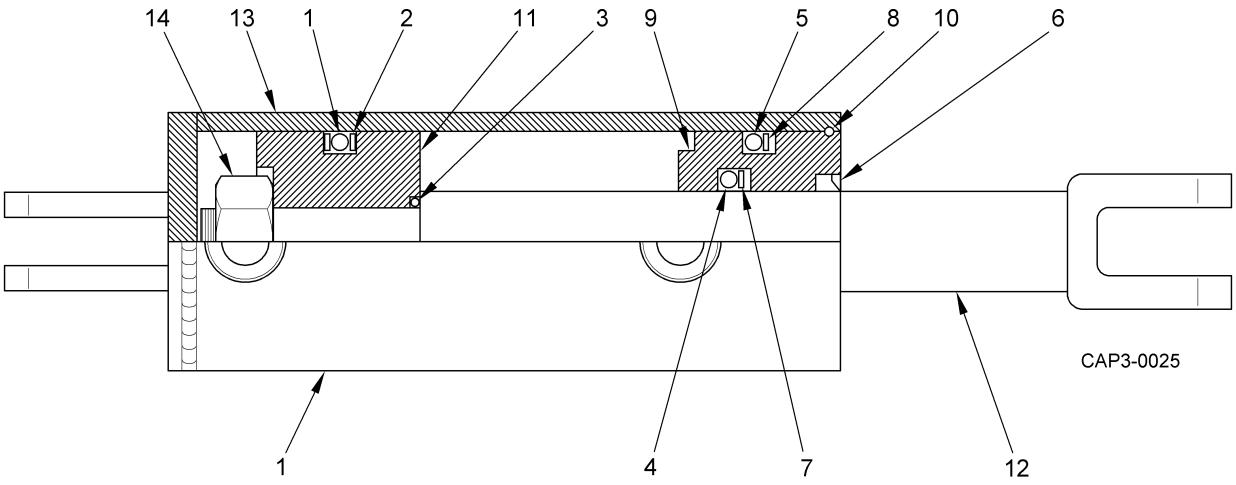
PARTS LIST

Figure 2-9. Low Pressure Filter Assembly



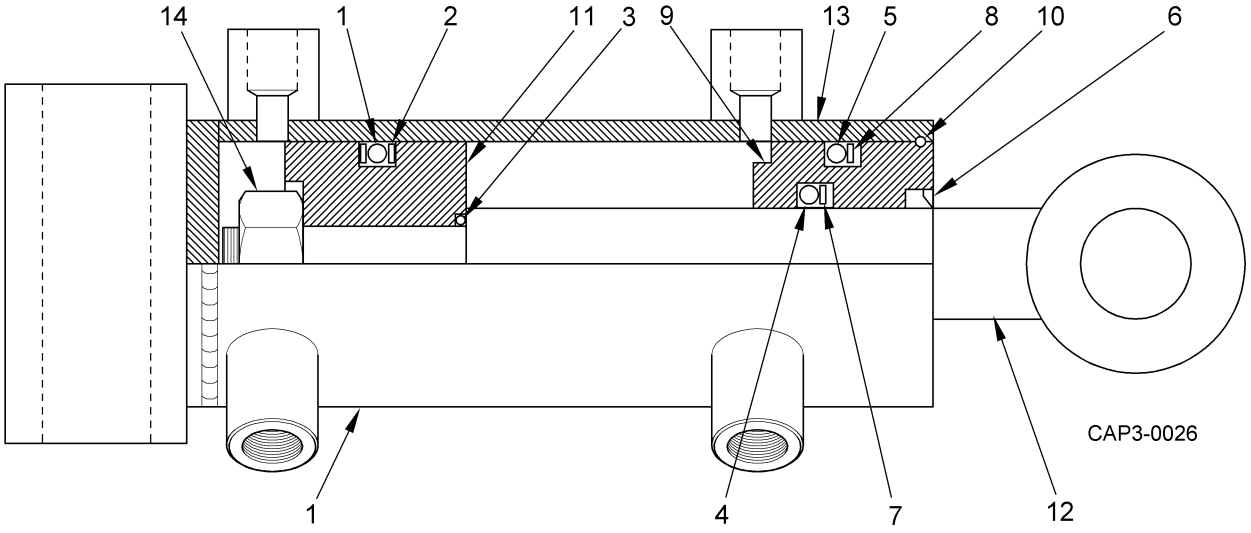
Item	P/N	Description	Qty
	376442	**Low Pressure Filter Assembly**	
1	9101798	Filter Element	2
2	9101796	Filter Head, Bypass	1
3	9101797	Filter Head, Relief	1
4	467605	Tee Adapter	1
5	117967	90 Degree Adapter	2
6	103866	Straight Adapter	1
7	441550	Bolt	4
8	011321	Washer	4

Figure 2-10. Steering Cylinder



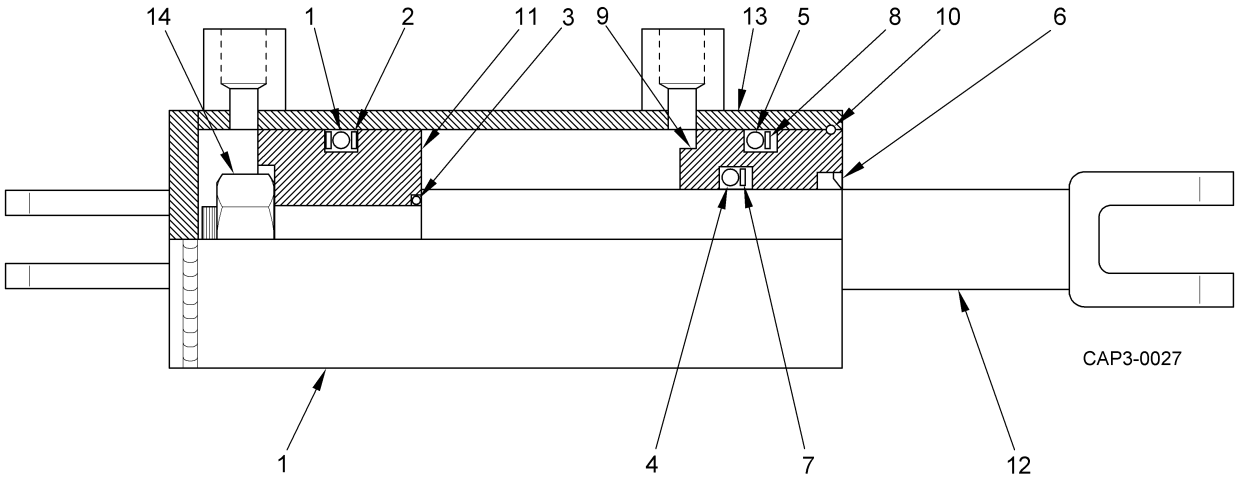
Item	P/N	Description	Qty
	467978	**Steering Cylinder**	
1 - 8	9104141	Seal Kit	1
9	468009	Gland, Head	1
10	468017	Retainer, Round	1
11	468025	Piston, Cylinder	1
12	468041	Rod, Piston	1
13		Tube, Cylinder (Not sold separately)	1
14	092460	Nut, Jam	1

Figure 2-11. Broom Lift Cylinder



Item	P/N	Description	Qty
	376641	**Broom Lift Cylinder**	
1-8	9104141	Kit, Seal	1
9	4679939	Gland, Head	1
10	468017	Retainer, Round	1
11	468025	Piston, Cylinder	1
12		Rod, Piston	1
13		Tube, Cylinder (Not sold separately)	1
14	093460	Nut, Jam .75-16 NF	1

Figure 2-12. Broom Swing Cylinder



Item	P/N	Description	Qty
	467986	**Broom Swing Cylinder**	
1-8	9104141	Kit, Seal	1
9	467993	Gland, Head	1
10	468017	Retainer, Round	1
11	468025	Piston, Cylinder	1
12		Rod, Piston	1
13		Tube, Cylinder (Not sold separately)	1
14	092460	Nut, Jam .75-16 NF	1

Section 3. Brakes

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3-3 Brake Hubs	3-6
3-4 Hydraulic Disconnect With Brake Assembly	3-8
3-5 Wheel Disconnect With Brake Assembly	3-10
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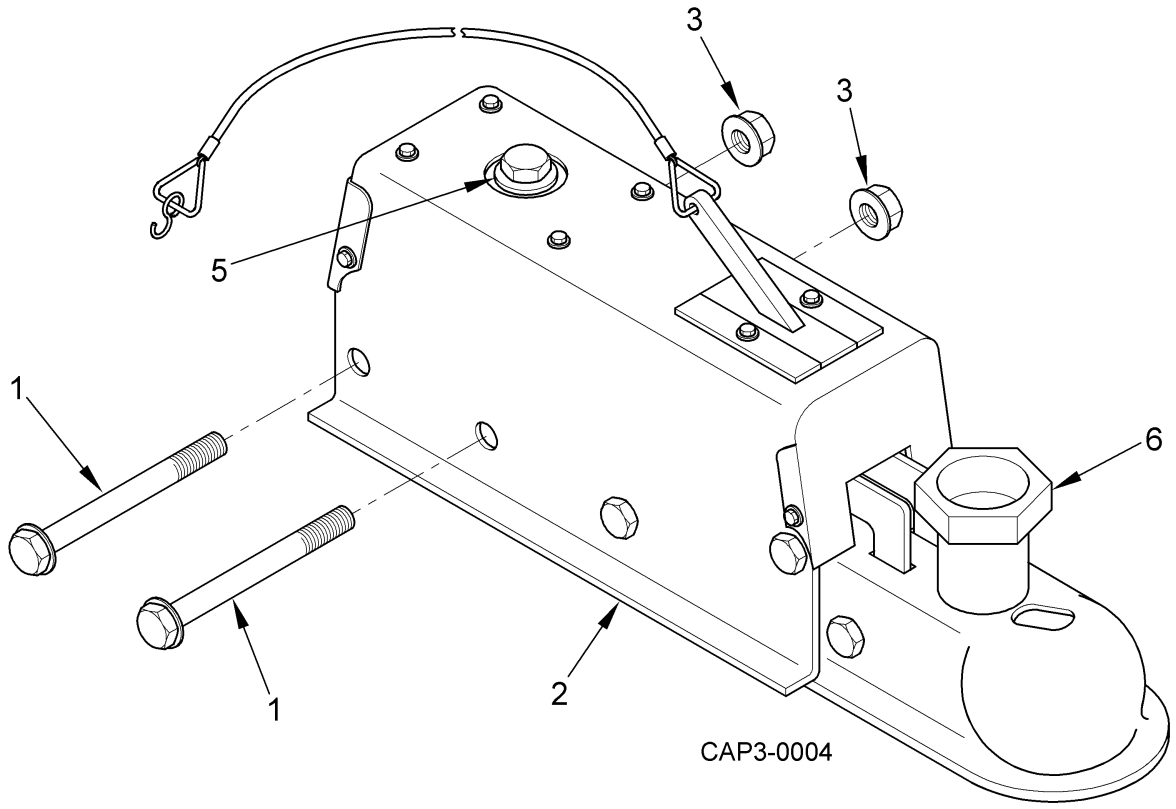
PARTS LIST

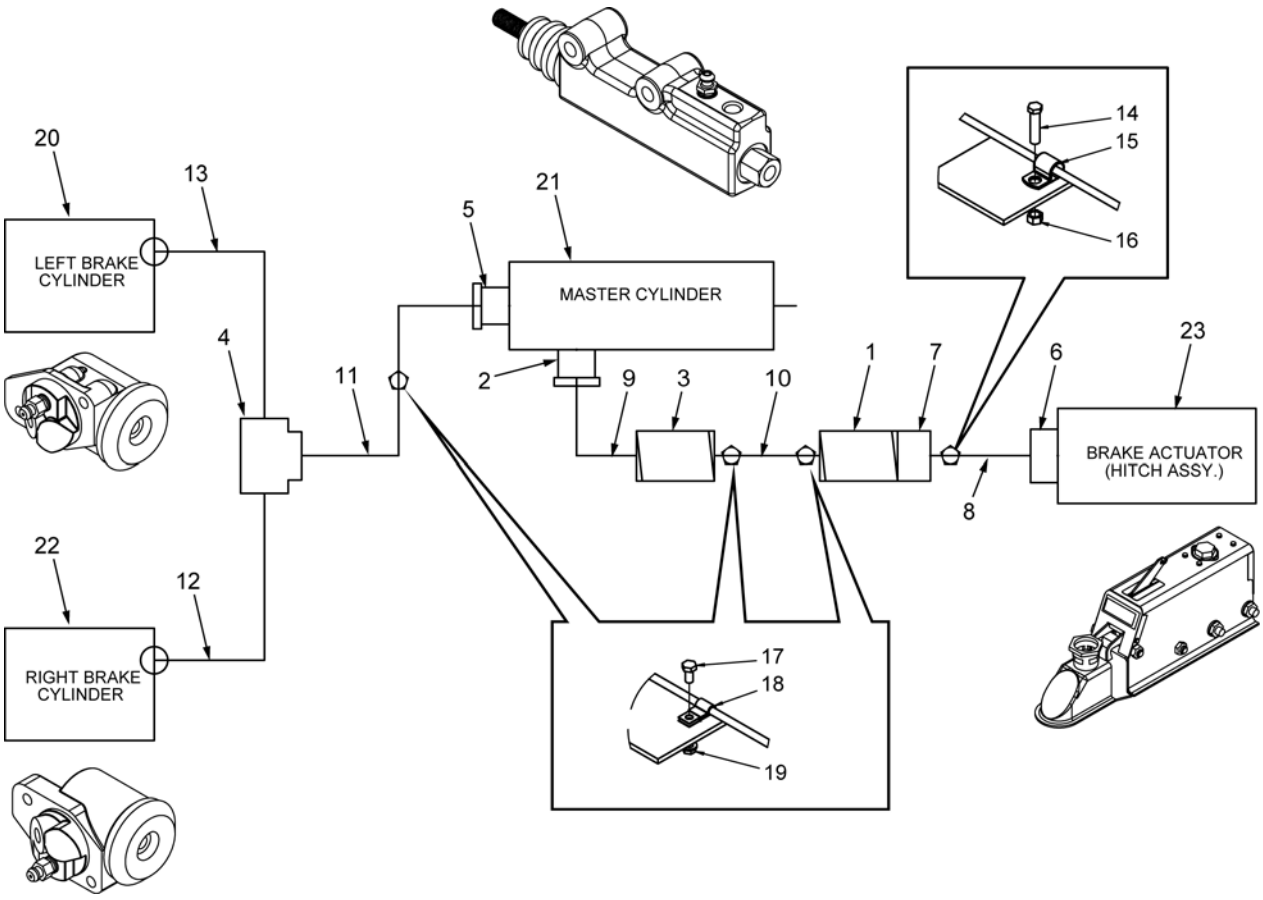
Figure 3-1. Surge Brake Actuator



Item	P/N	Description	Qty
1	011460	Capscrew	2
2	447995	2” Ball, Surge Brake Actuator	A/R
	448084	2 5/16 Ball, Surge Brake Actuator (Optional)	
	448076	3” Pintle Eye, Surge Brake Actuator (Optional)	
	448977	Universal Surge Brake Actuator (Optional)	
3	403907	Hex Nut	2
4	9104396	Adapter, 2”, 2-5/16”, 3” Tongue (Not illustrated)	A/R
	9104506	Adapter, Universal Tongue (Not illustrated)	
5	374009	Cap, Modified Master Cylinder	1
6	474338	Actuator Nut	1
	448142	Kit, Master Cylinder Repair (Not illustrated) (Used on P/N 448084, 448076 and 448977)	1
	464735	Kit, Master Cylinder Repair (Not illustrated) (Used on P/N 447995)	1
	461400	Kit Coupler Repair (Not illustrated)	1
		* Lock Nut	
		* Capscrew	
		* Compression Spring	
		* Lock Ring	
		* Plated Ball Latch	
7	377333	Pig Tail Hitch Harness	1
The following items are used only with Universal Surge Brake Actuator P/N 448977			
	9102857	Coupler, 2” Ball (Not illustrated)	1
	9103126	Coupler, 2-5/16” Ball (Not illustrated)	1
	9101885	Coupler, 3” Pintle Eye (Not illustrated)	1
	012153	Capscrew (Not illustrated)	2
	406231	Hex Nut (Not illustrated)	2

PARTS LIST

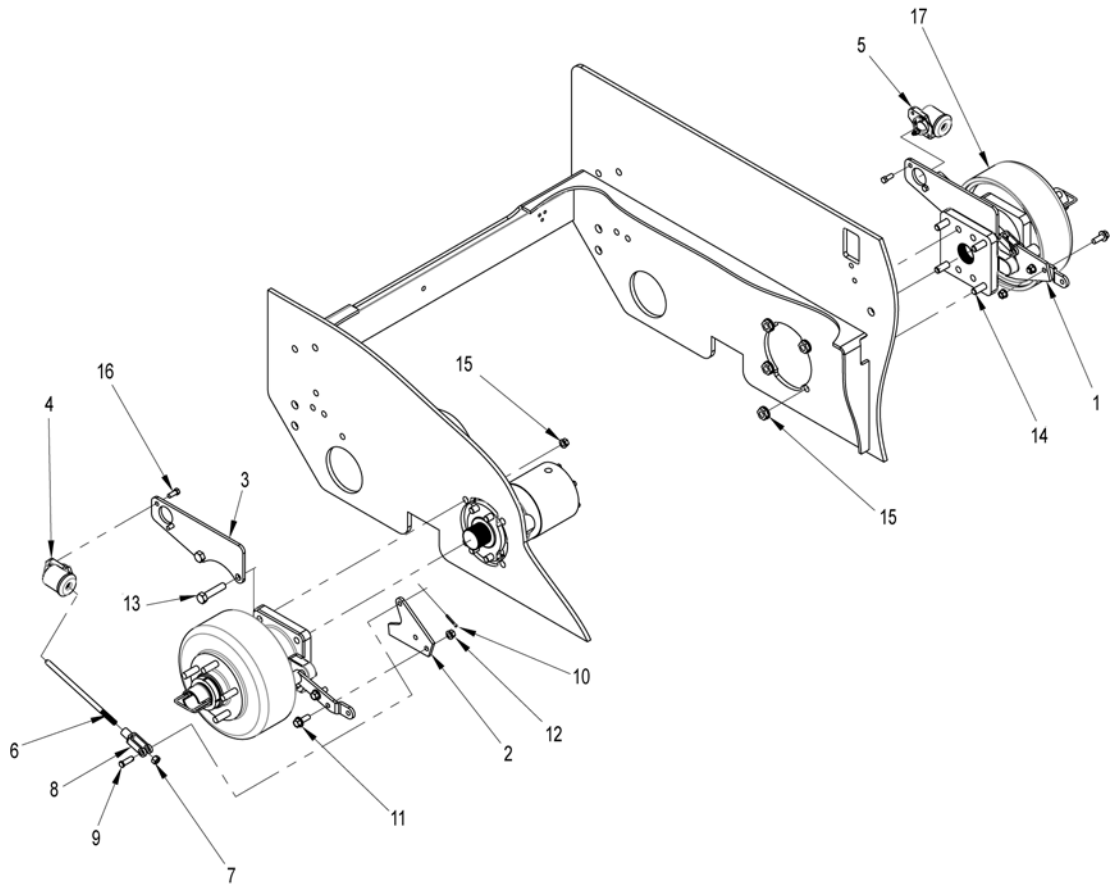
Figure 3-2. Brake Line Assembly



Item	P/N	Description	Qty
	374629	**Brake Line Assembly**	
1	448845	Flare Union	1
2	054171	Flare	1
3	067561	Flare Union	1
4	434944	Tee	1
5	060533	Fitting	1
6	044495	Fitting	1
7	077495	Fitting	1
8	377382	Hose Assembly, 47-inch	1
9	377150	Brake Line	1
10	067728	Brake Line	1
11	252148	Brake Line	1
12	377168	Brake Line	1
13	377176	Brake Line	1
14	441618	Capscrew	1
15	028993	Clamp	1
16	083493	Nut	1
17	441501	Capscrew	3
18	036715	Clamp	3
19	440636	Nut	3
20	409110	Brake Cylinder, Left	1
21	100086	Master Cylinder	1
22	409128	Brake Cylinder, Right	1
23	374728	Surge Brake Actuator (Hitch Assembly) (See Figure 1-3 for breakdown)	1

PARTS LIST

Figure 3-3. Brake Hubs



Item	P/N	Description	Qty
	100249	**Ground Drive Assembly**	
1	9104328	Brake Arm, RH	1
2	9103730	Wheel Drive Motor (See Figure 2-3 for breakdown)	2
3	9104331	Brake Arm, LH	1
4	9104327	Plate, Wheel Cylinder Mount	2
5	409110	Wheel Cylinder, LH	1
6	409128	Wheel Cylinder, RH	1
7	9104334	Rod, Wheel Cylinder Actuator	2
8	031948	Nut	2
9	031930	Clevis Rod End	2
10	025767	Clevis Pin	2
11	015131	Cotter Pin	2
12	441477	Locknut	4
13	413856	Bolt	4
14	011395	Bolt	4
15	011387	Bolt	4
16	440644	Locknut	8
17	083485	Bolt	4
18	9104349	Hub, Hydraulic Disconnect With Brake (See Figure 3-4 for breakdown)	

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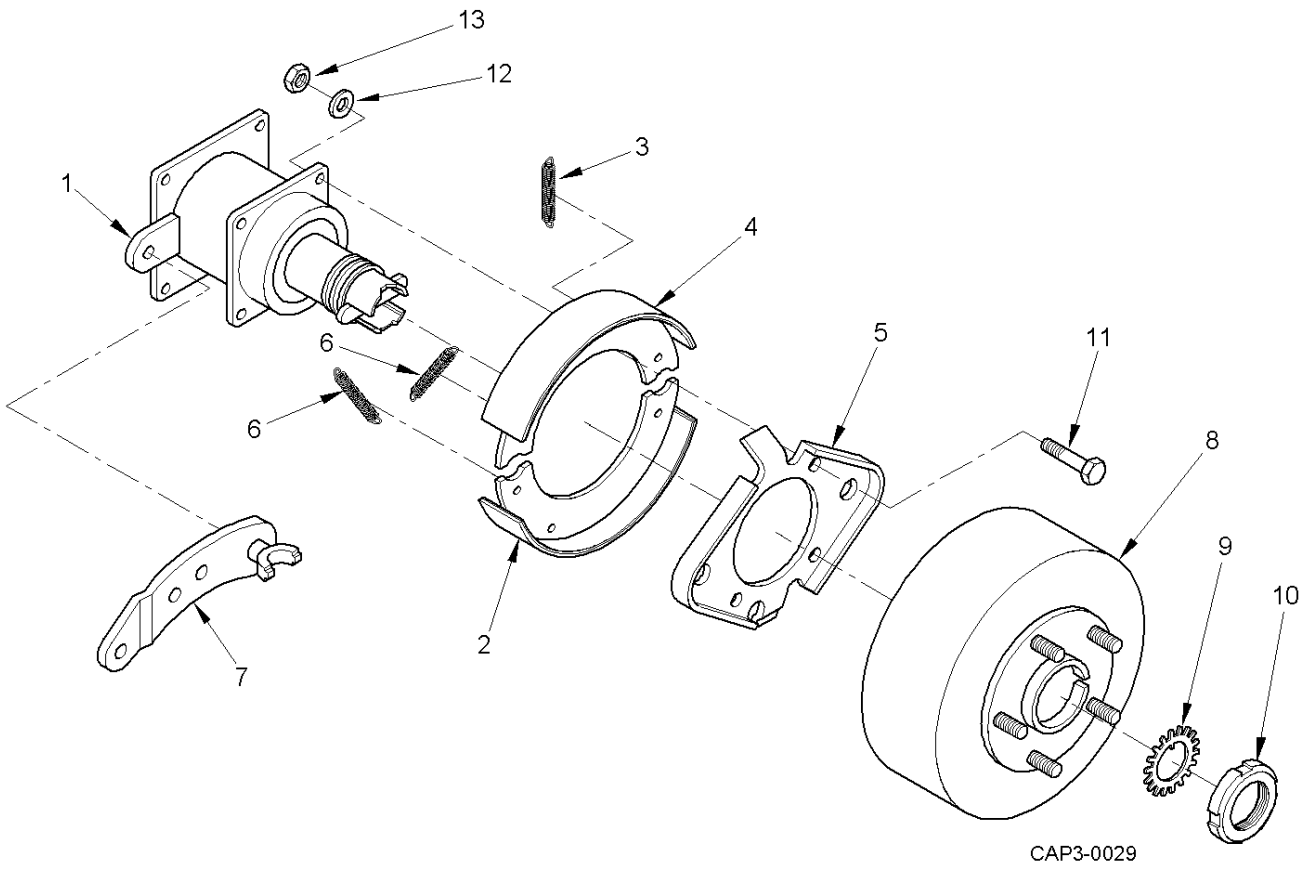
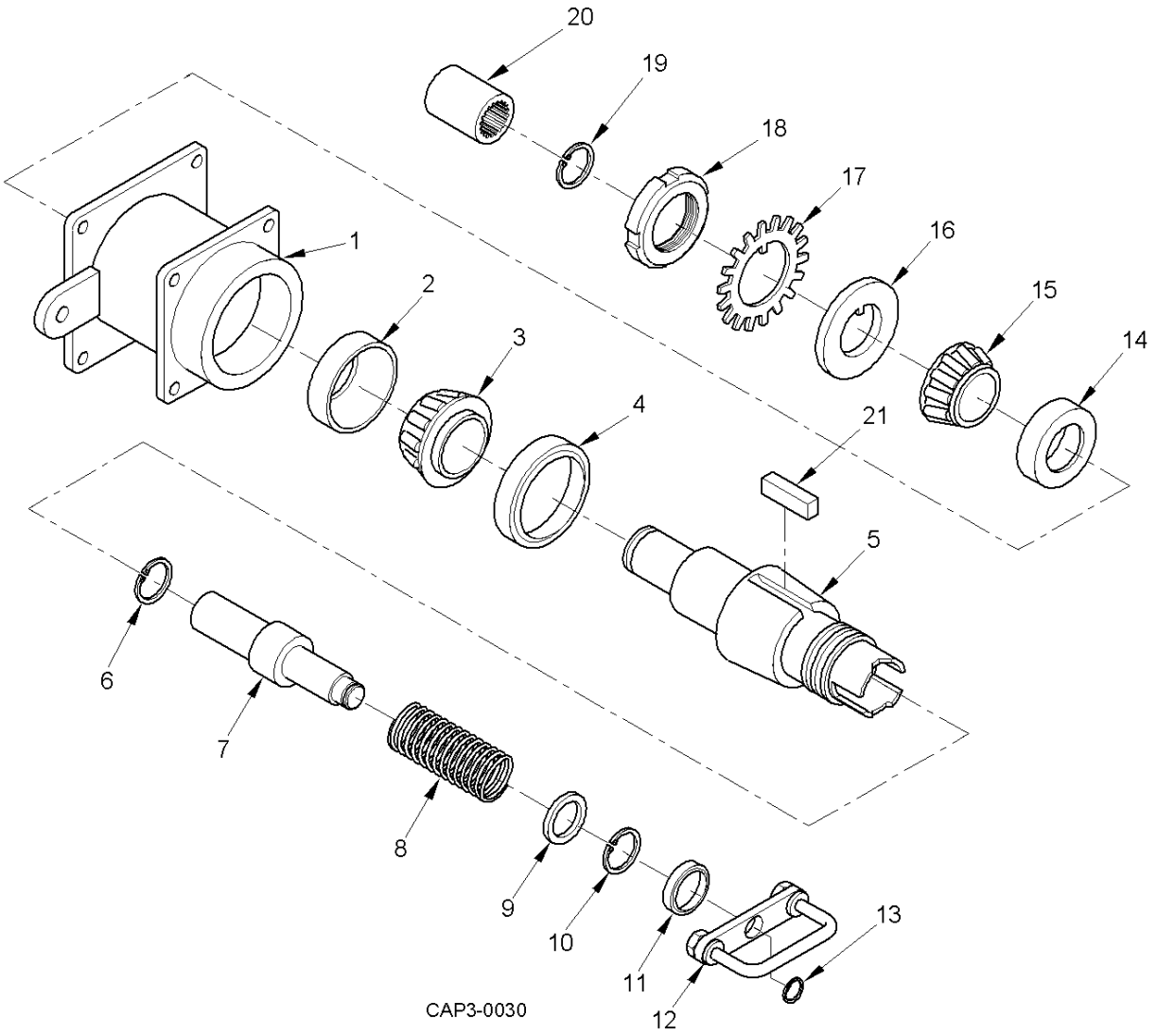
Figure 3-4. Hydraulic Disconnect With Brake Assembly



Item	P/N	Description	Qty
	9104349	**Hydraulic Disconnect with Brake Assembly**	
1		Hub (See 3-5 Wheel Disconnect With Brake Assembly for breakdown)	1
2	9101879	Assembly, Brake Pad	1
3		* Spring	1
4		* Pad, Brake	2
5		* Plate, Backing	1
6		* Spring	2
7	9103170	Disconnect Brake Arm	1
8	9103171	Disconnect Brake Drum (Wheel Bolt 452193 on Drum - Not Sold Separately)	1
9	9102092	Disconnect Lock Ring	1
10	9102091	Disconnect Lock Nut	1
11	056879	Capscrew	4
12	011643	Lock Washer	4
13	041582	Nut	4
14	366914	Hub Wrench (Not illustrated)	1

PARTS LIST

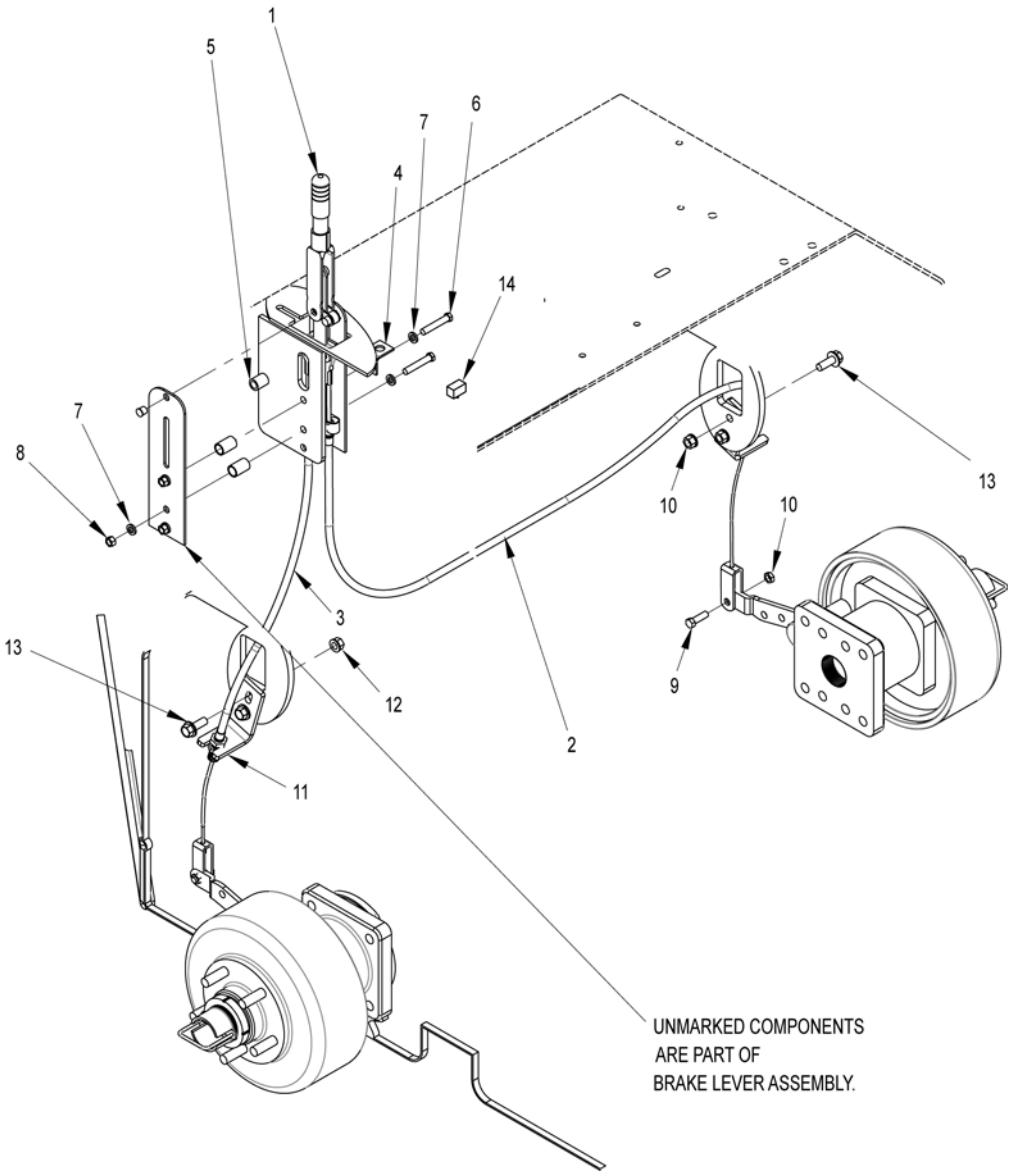
Figure 3-5. Wheel Disconnect With Brake Assembly



Item	P/N	Description	Qty
	9104349	**Wheel Disconnect w/Brake Assembly**	
1	9103168	Housing (Without Brake, Housing Only)	1
2	V61011600	Cup, Outer Bearing	1
3	V61011700	Cone, Outer Bearing	1
4	9102975	Seal, Inner Bearing	2
5	9103159	Spindle Shaft, Disconnect	1
6	9103160	Snap Ring, O.D.	1
7	9103161	Shaft, Internal Small	1
8	9102945	Spring, Hydraulic Disconnect	1
9	9102976	Washer, Hydraulic Disconnect	1
10	9103162	Snap Ring, Hydraulic Disconnect	
11	9102974	Outer Seal, Disconnect Small	1
12	9102094	Disconnect, Ear/Handle	1
13	034660	Disconnect, Ear/Handle Snap Ring	1
14	066993	Disconnect, Inner Bearing Cup	1
15	067017	Disconnect, Inner Bearing Cone	1
16	9103165	Disconnect, Inner Bearing Tongue Washer	1
17	9102092	Disconnect, Lock Ring	2
18	9102091	Disconnect, Lock Nut	2
19	9103163	Disconnect, Spline Coupler Snap Ring	1
20	9101468	Disconnect, Spline Coupler	1
21	9103167	Disconnect, Wheel Hub Key	1
22	042275	Plug (Not illustrated)	2

PARTS LIST

Figure 3-6. Parking Brake Assembly



Item	P/N	Description	Qty
		Parking Brake Assembly	
1	467600	Brake Lever Assembly	1
2	467599	Cable Brake Actuating Assembly	1
3	467598	Cable Brake Actuating Assembly	1
4	352054	Clip Nut Mount	1
5	460681	Rear Compression Mount Sleeve	1
6	441634	Capscrew	3
7	010579	Washer	6
8	083493	Nut	3
9	441600	Bolt	2
10	093799	Nylon Nut	2
11	377648	Brake Cable Bracket	2
12	441477	Locknut	4
13	413856	Bolt	4
14	413875	Switch, Neutral Start	1

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Section 4. Electrical

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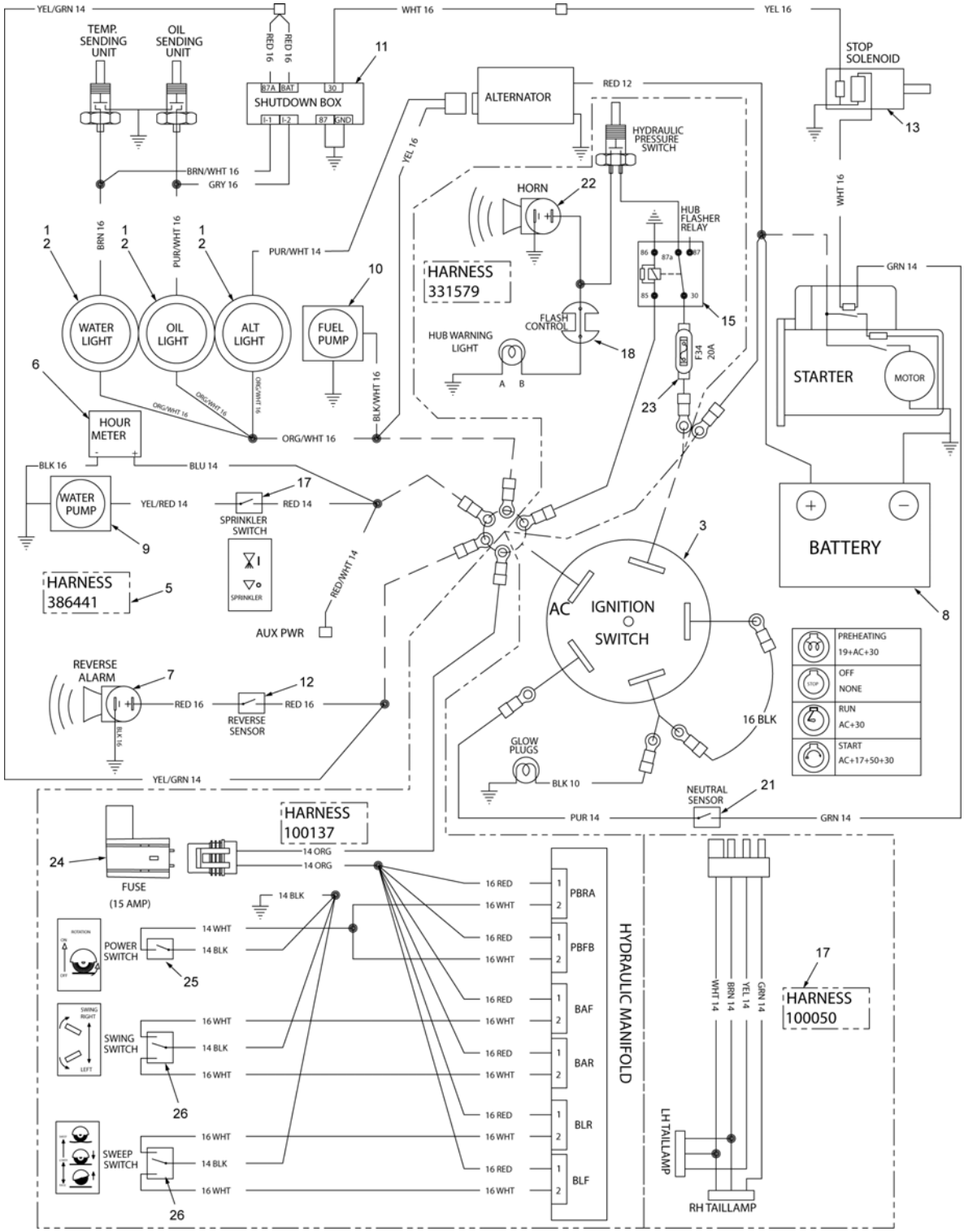
4-1 Wiring Harness Assembly	4-2
4-2 Tail Light Assembly	4-4
4-3 Battery Assembly	4-6
4-4 Hub Disengage Warning System	4-8

PARTS LIST

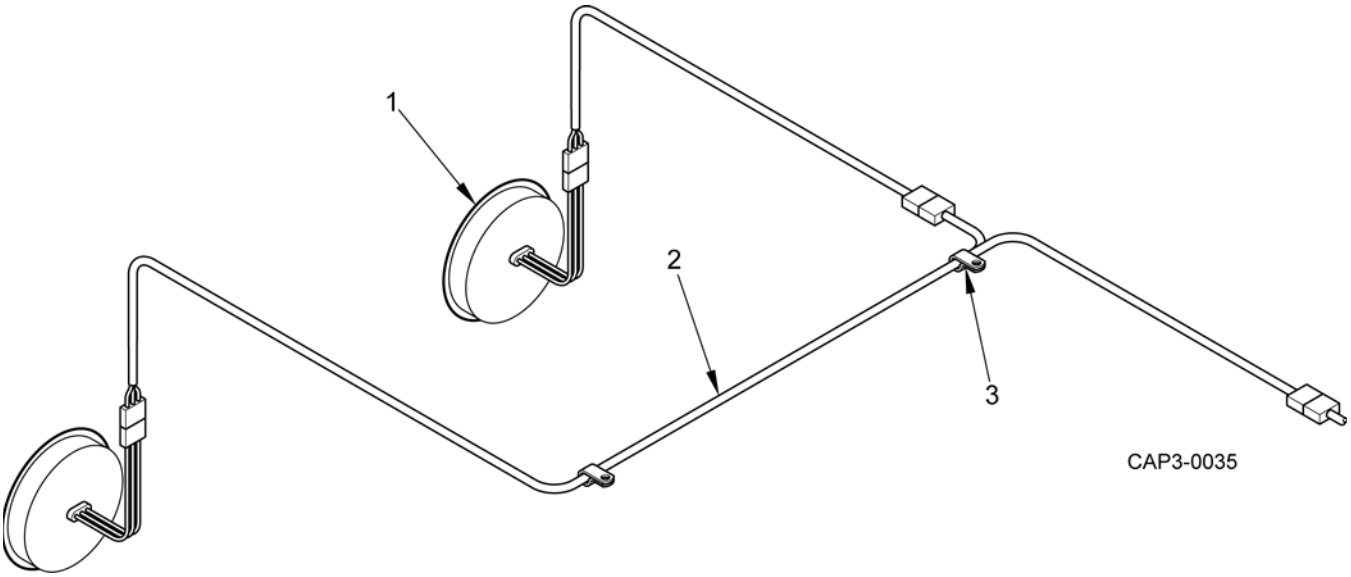
Figure 4-1. Wiring Harness Assembly



Item	P/N	Description	Qty
		Wiring Harness Assembly	
1	386441	Main Engine Wiring Harness	1
2	057448	Light, Red Indicator	3
3	060624	Bulb, 12V 2W	3
4	460485	Meter, Hour	1
5	473736	Alarm, Reverse	1
6	416826	Pump, Water	1
7	9101888	Pump, Fuel	1
8	465229	Module, Engine Protection	1
9	477182	Switch, Forward/Reverse	2
10	447673	Solenoid, Fuel Shut-Off	1
	473066	Gasket, Fuel Solenoid (Not shown)	1
	477406	Solenoid Terminal Connector Kit (Not shown)	1
11	460113	Switch, Sprinkler Pump	1
12	331579	Hub Disconnect Warning Wiring Harness	1
13	V63121300	Flasher	1
14	442095	Relay, 12V 30A	1
15	9101497	Switch, Ignition	1
16	100137	Manifold Wiring Harness	1
17	100050	Tail Light Wiring Harness	1
18	V63121300	Flasher	1
19	381418	Strobe Light Kit (Not shown)	1
20	094623	Strobe Light Bulb (Not Shown)	1
21	413875	Neutral Sensor	1
22	476937	Horn	1
23	077041	Fuse (20A)	1
24		Fuse, Mini (15A)	1
25	100136	Switch, Power	1
26	100135	Switch, 3 Position (Broom On/Off and Broom Up/Down)	2
	9101528	Key (Set of 2 included with switch) (Not shown - see 1-6 Ignition Key Identification)	1
	381418	Strobe Light Kit (Not shown)	1
	094623	Strobe Lamp (bulb) (Not shown)	1

PARTS LIST

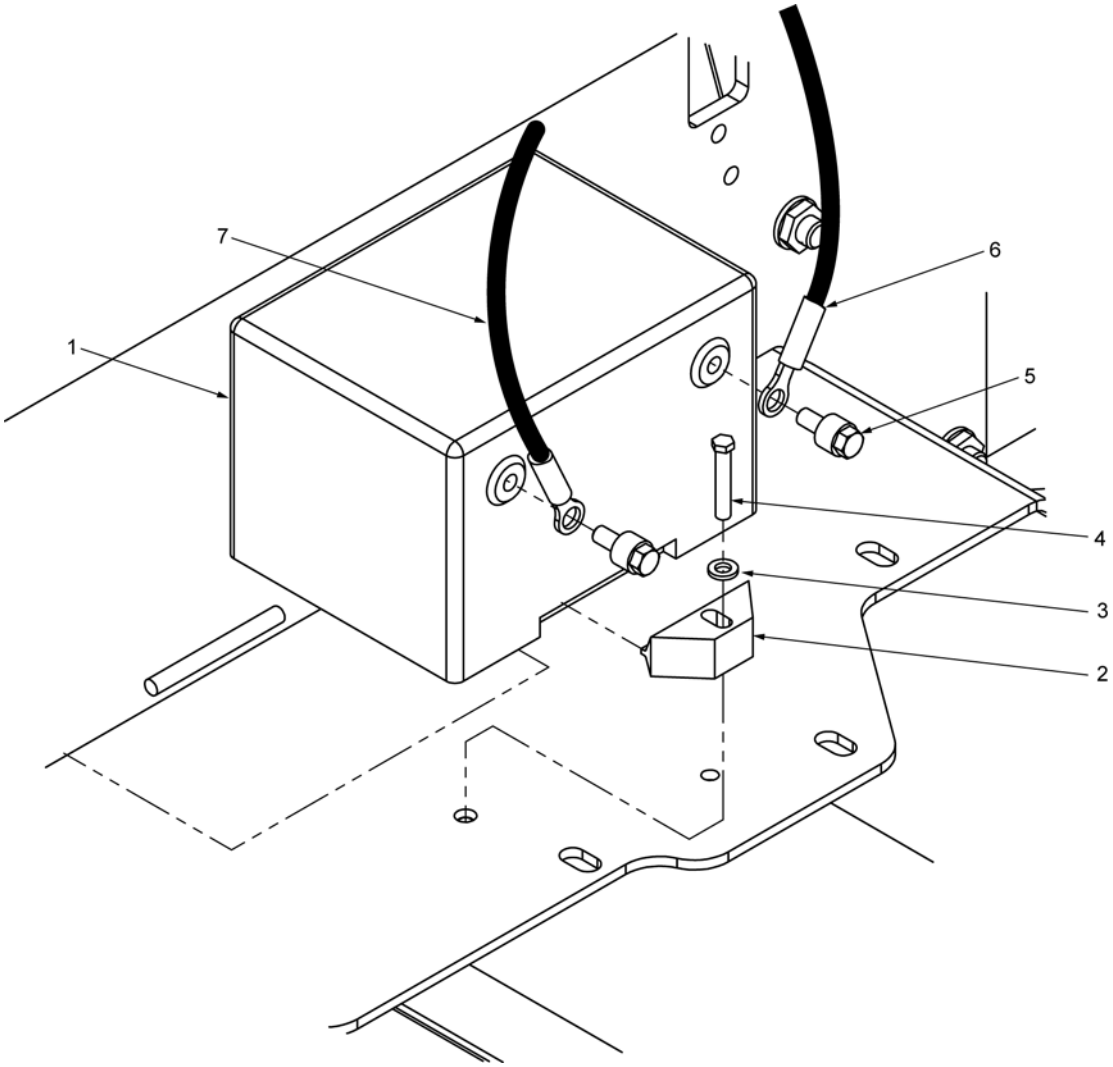
Figure 4-2. Tail Light Assembly



Item	P/N	Description	Qty
		Tail Light Assembly	
1	100134	Assembly, Tail Light	2
2	377051	Harness, Wiring	1
3	028993	Clamp, .50” I.D.	2
4	377077	Harness, Main (Not illustrated)	1
5	377333	Harness, Hitch - Connects to Main Harness (Not illustrated)	1
6	377325	Harness, Tail Light Frame (Not illustrated)	1

PARTS LIST

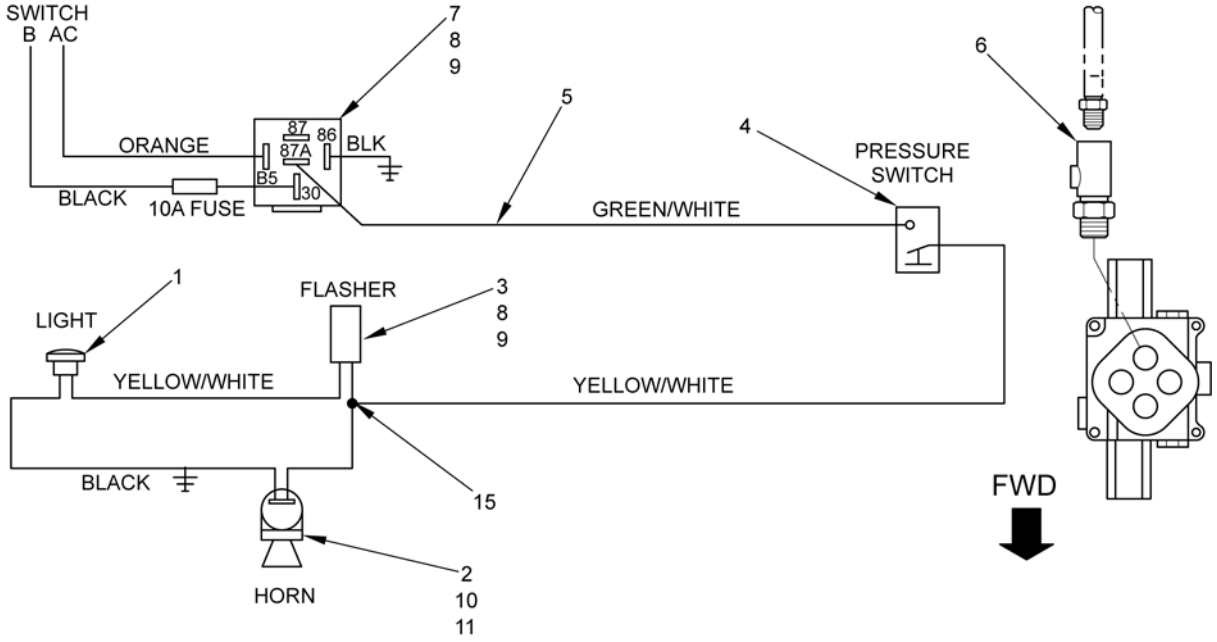
Figure 4-3. Battery Assembly



Item	P/N	Description	Qty
	100246	**Battery Assembly**	
1	9101583	Battery, 12V	1
2	474882	Hold Down, Battery	1
3	011322	Washer	1
4	441634	Capscrew	1
5	477958	Extension, Battery Post	2
6	376822	Cable, Black	1
7	376830	Cable, Red	1

PARTS LIST

Figure 4-4. Hub Disengage Warning System



CAP3-0071

Item	P/N	Description	Qty
	331587	**Hub Disengage Warning System**	
1	446229	Light, Oval Tail	1
2	476937	Horn, 12V - with Bracket	1
3	V63121300	Flasher, Turn Signal	1
4	475889	Switch, Pressure	1
5	331579	Harness, Wiring (Unlock Hubs)	1
6	475871	Adapter, Test Port	1
7	442095	Relay	1
8	465104	Screw	2
9	465153	Nut	2
10	441519	Capscrew	1
11	474734	Nut	1
12	041236	Tie, Cable (Not illustrated)	10
13	331561	Cover, Dash - with Light Hole (Not illustrated)	1
14	472704	Decal, “Disengage Rear Hubs” (Not illustrated)	1
15	V01162800	Terminal	1

Section 5. Broom

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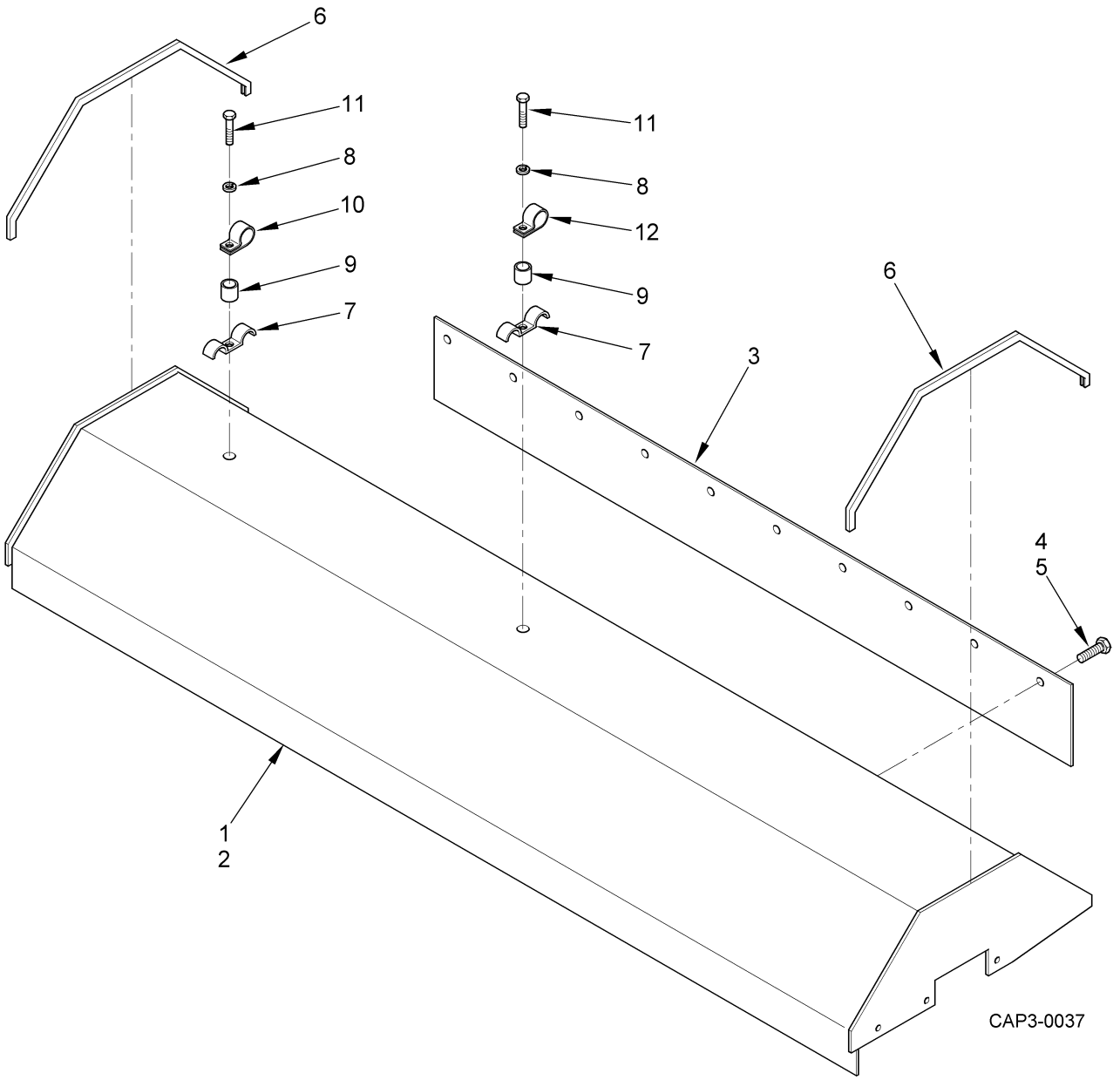
5-1 Hood Assembly 5-2
5-2 Broom Assembly 5-4
5-3 Broom Frame Assembly 5-8
5-4 Water Pump 5-10
5-5 Broom Kits 5-11

PARTS LIST

Figure 5-1. Hood Assembly



Item	P/N	Description	Qty
		Broom Hood Assembly	
1	382002	Weldment, Hood (8 ft. Broom)	1
2	381988	Weldment, Hood (6 ft. Broom)	1
3	377614	Deflector, Dirt Belt (8 ft. Broom)	1
	377622	Deflector, Dirt Belt (6 ft. Broom)	1
4	441568	Capscrew (8 ft. Broom)	16
	441568	Capscrew (6 ft. Broom)	12
5	440636	Hex Nut (8 ft. Broom)	16
	440636	Hex Nut (6 ft. Broom)	12
6	074567	Trim, Flex Core .06	8.2 ft
7	9100716	Clamp, Hose (8 ft. Broom)	3
	9100716	Clamp, Hose (6 ft. Broom)	2
8	011023	Lock Washer (8 ft. Broom)	3
	011023	Lock Washer (6 ft. Broom)	2
9	147322	Tube (8 ft. Broom)	3
	147322	Tube (6 ft. Broom)	2
10	010645	Capscrew (8 ft. Broom)	3
	010645	Capscrew (6 ft. Broom)	2
11	461384	Clamp, Hose	1

PARTS LIST

Figure 5-2. Broom Assembly

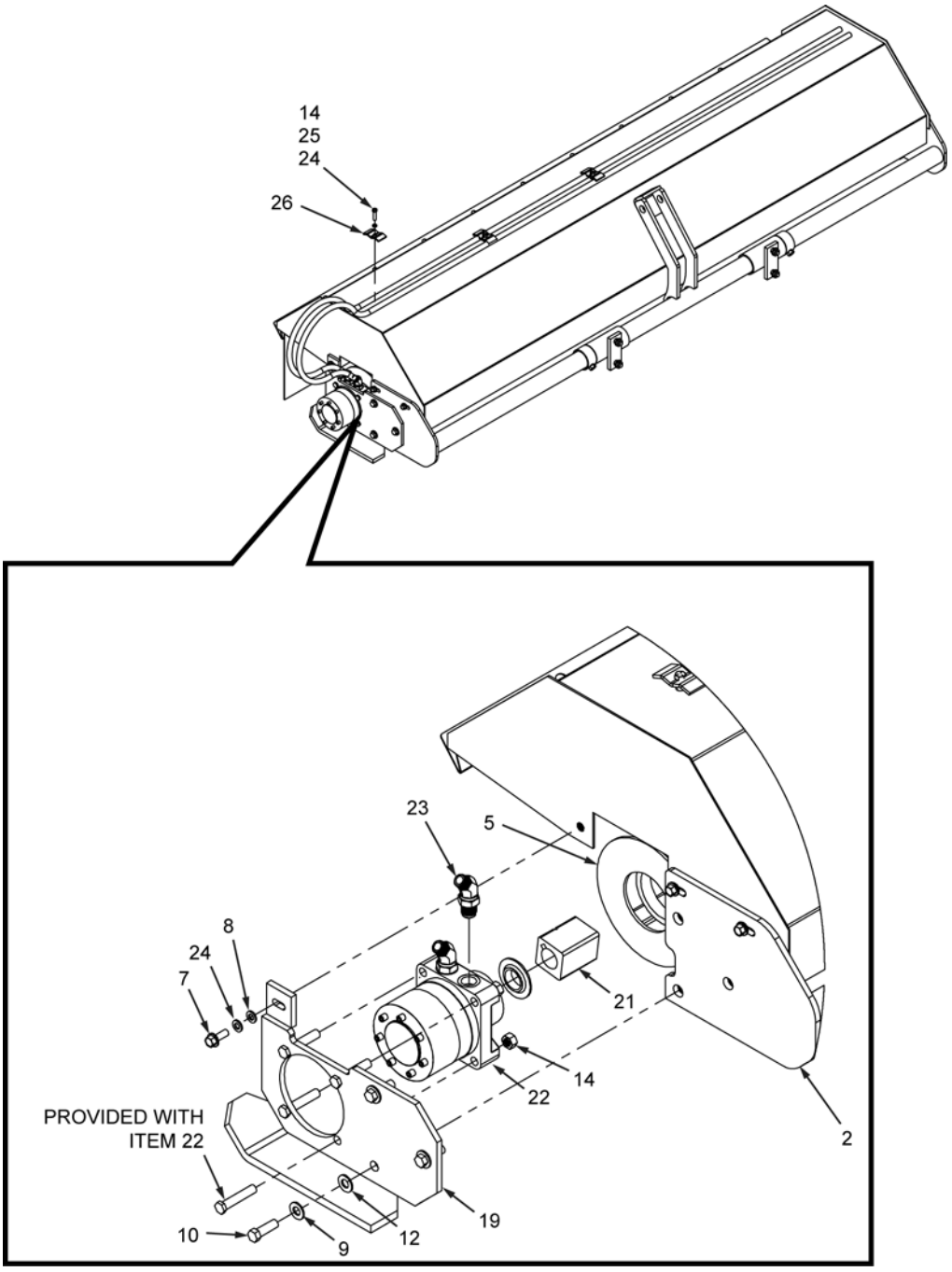
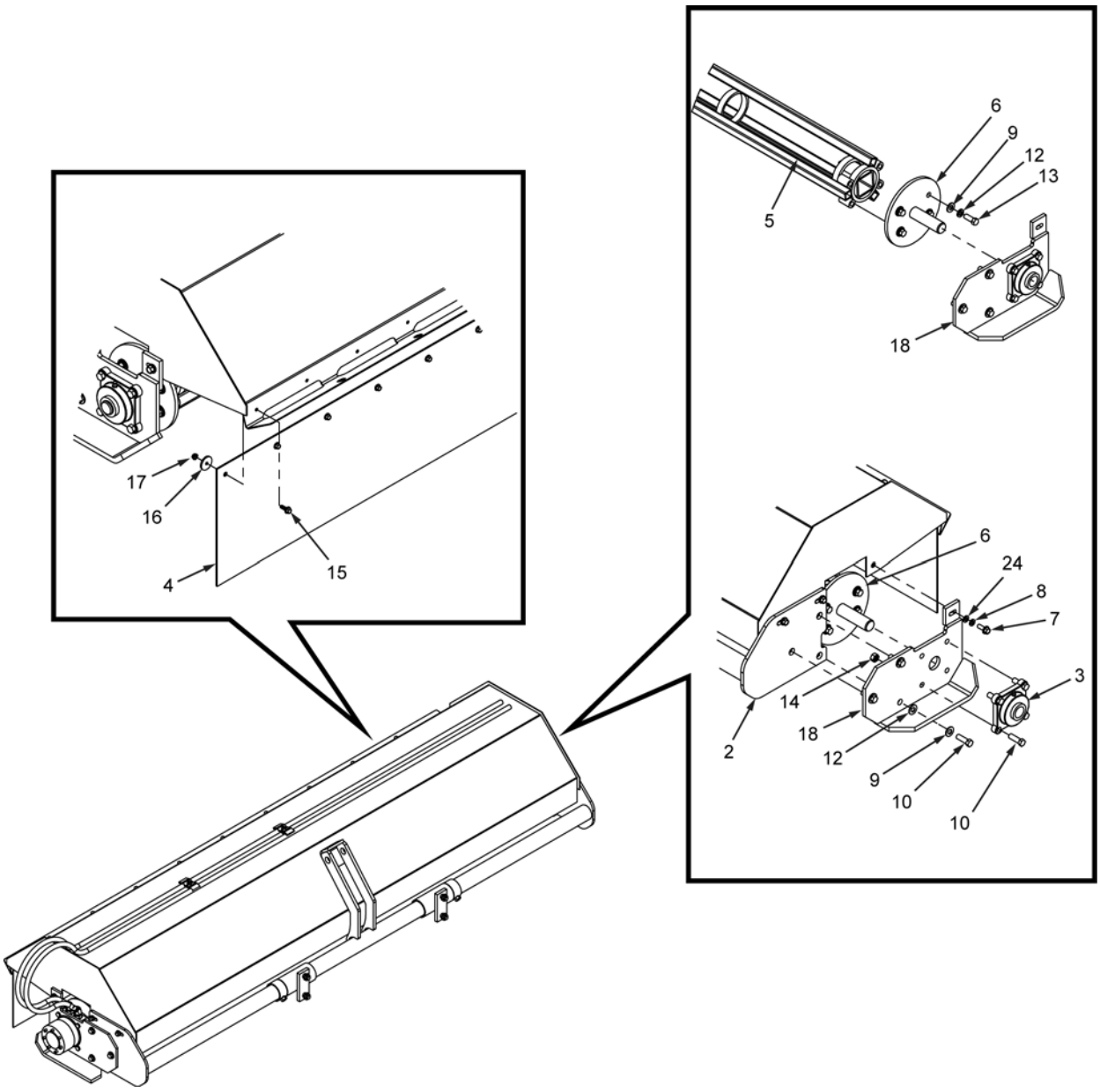
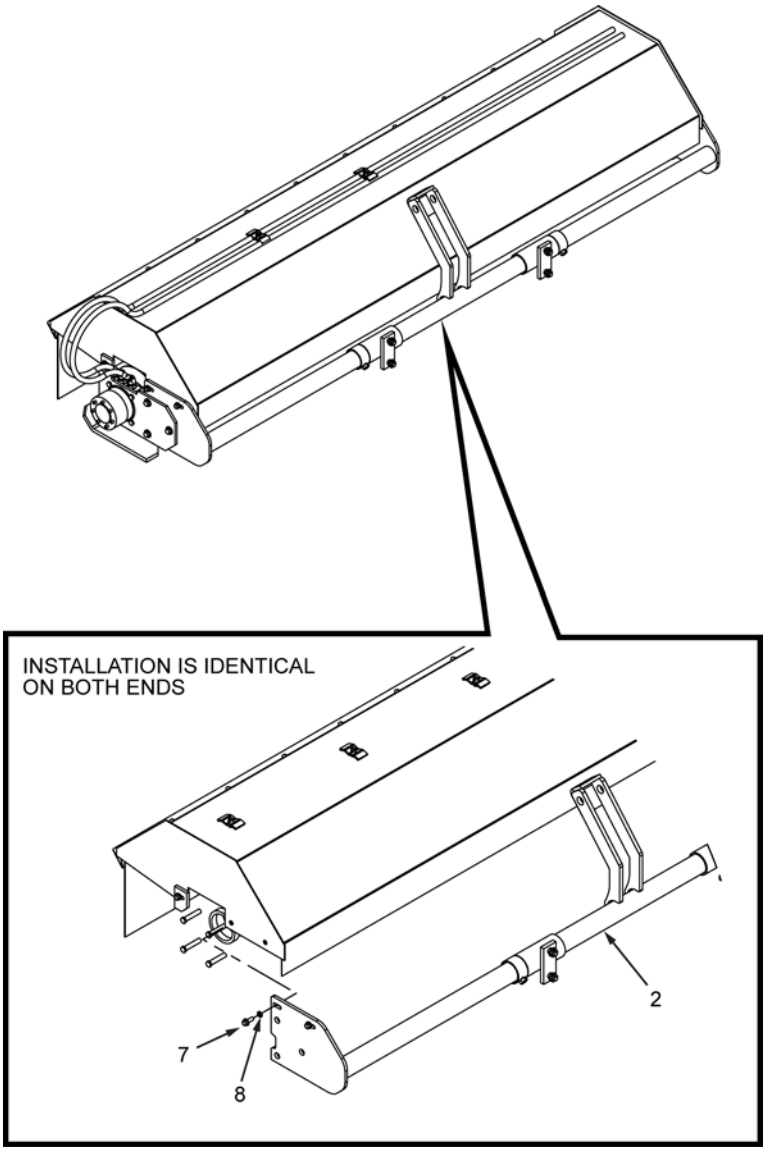


Figure 5-2. Broom Assembly - Continued



PARTS LIST

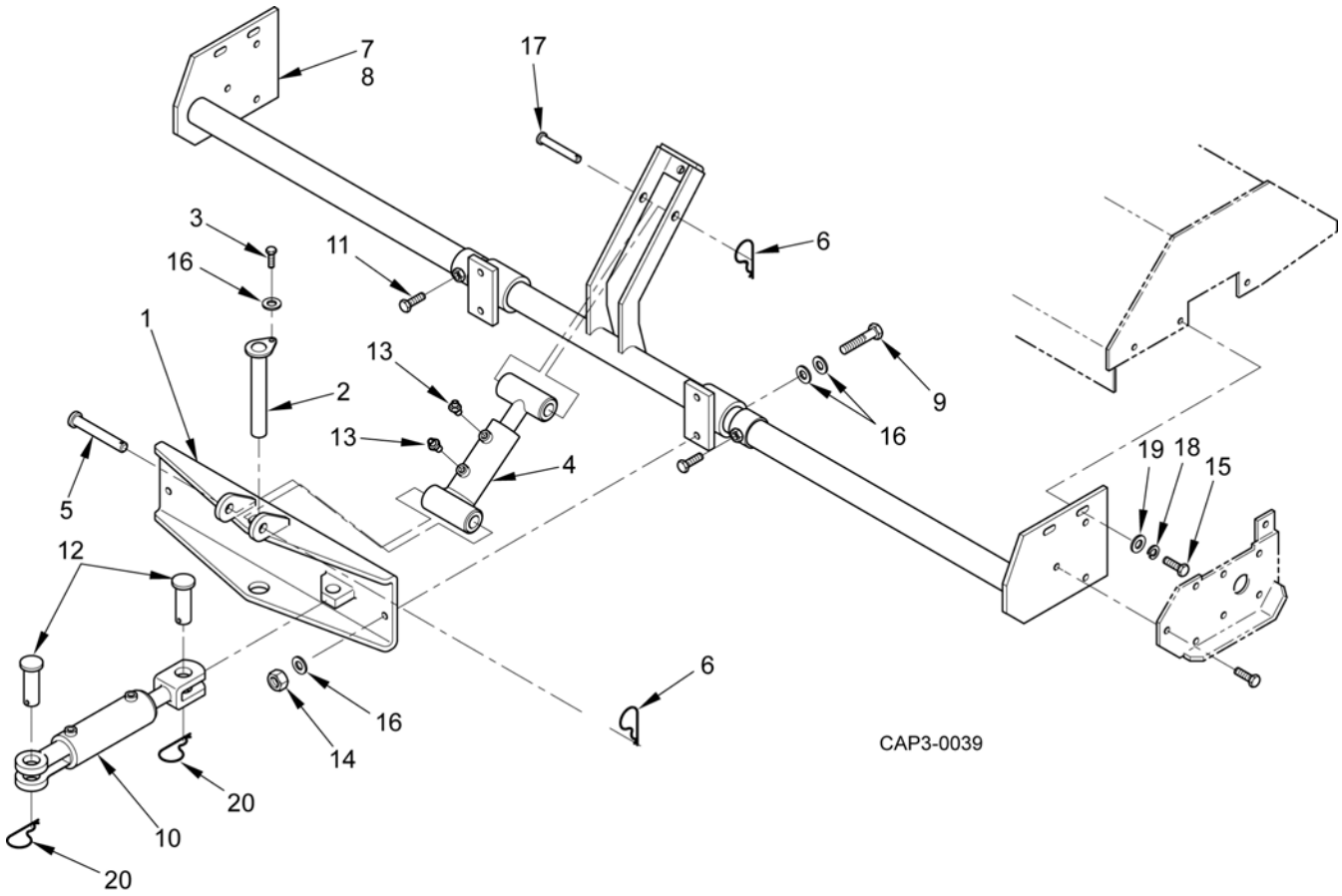
Figure 5-2. Broom Assembly - Continued



Item	P/N	Description	Qty
		Broom Assembly (8 ft.)	1
1	382002	Broom Hood	1
2	376582	Broom Mount	1
3	V66005800	Bearing, Broom Shaft	1
4	377614	Dust Deflector (8')	6
5	9102693	Broom Core	1
6	376285	Broom Core Mount	6
7	413856	Bolt	6
8	011323	Washer	22
9	011325	Washer	14
10	441782	Bolt	4
11	440644	Locknut	10
12	011643	Lockwasher	4
13	441774	Bolt	11
14	425801	Locknut	16
15	441550	Bolt	16
16	010299	Washer	16
17	440636	Locknut	1
18	376590	Bearing Mount, RH	1
19	376608	Broom Motor Mount, LH	1
20	378513	Seal Guard	1
21	9102713	Broom Motor Drive Block	1
22	473464	Broom Motor (See Figure 2-5 for breakdown)	1
23	477647	Fitting	2
24	011023	Lockwasher	3
25	010645	Capscrew	3
26	9100716	Hose Clamp	3

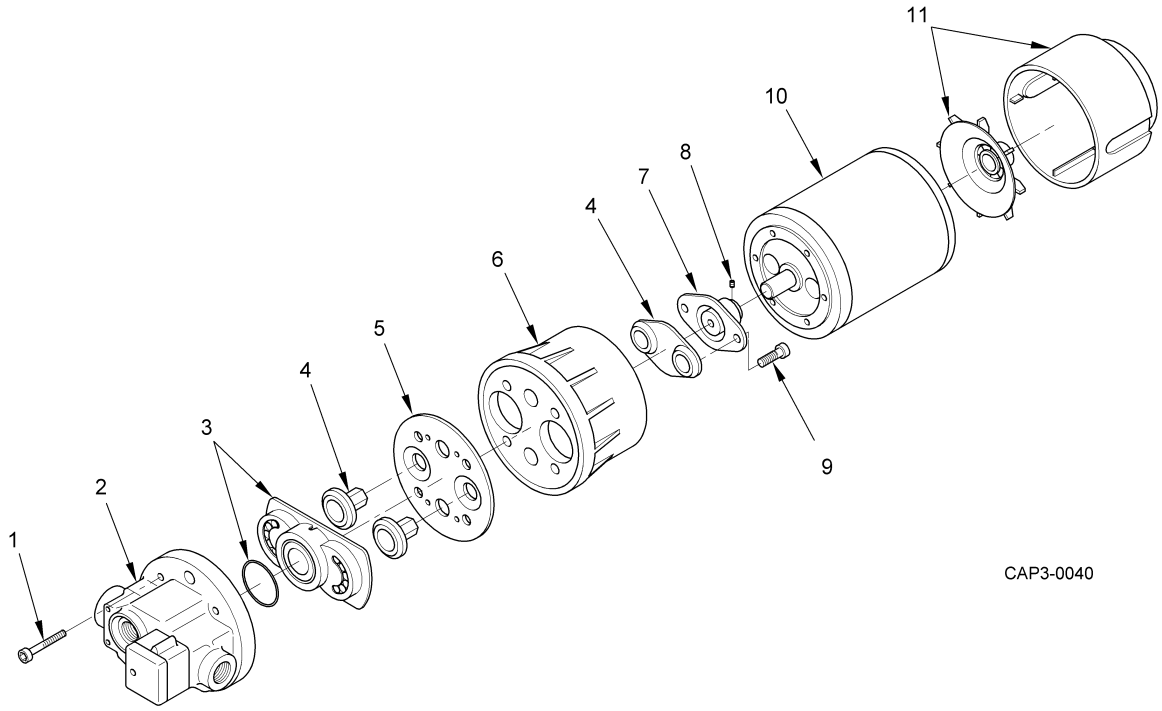
PARTS LIST

Figure 5-3. Broom Frame Assembly



Item	P/N	Description	Qty
		Broom Frame Assembly	
1	376160	Weldment, Broom Mount	1
2	377028	Straight Pin	1
3	441758	Capscrew	1
4	376641	Cylinder, Lift (See Figure 2-11 for breakdown)	1
5	100113	Straight Pin	1
6	015768	Hair Clip	2
7	376582	Weldment, Broom Mount (8 ft. Broom)	1
8	376574	Weldment, Broom Mount (6 ft. Broom)	1
9	441808	Capscrew	4
10	467985	Cylinder, Broom Swing (See Figure 2-12 for breakdown)	1
11	441766	Capscrew	2
12	9103034	Pin	2
13	092825	Adapter, 90º	2
14	440644	Hex Nut	4
15	083527	Capscrew	6
16	011325	Washer	13
17	100115	Pin	1
18	011023	Lockwasher	6
19	011323	Washer	6
20	039180	Hair clip	2

Figure 5-4. Water Pump



Item	P/N	Description	Qty
	416826	**Water Pump (No service parts available)**	
1		Screws, Pump	6
2		Assembly, Housing Switch	1
3		Valve, Check (No Slot)	1
4		Piston, Inner and Outer	1
5		Diaphragm	1
6		Cover, Bearing	1
7		Bearing, Cam	1
8		Set Screw, Cam Bearing	1
9		Screws, Cam Bearing	1
10		Motor	1
11		Shroud, Fan	1

Figure 5-5. Broom Kits

Item	P/N	Description	Qty
	467986	**Broom Kits**	
1	9100458	Poly Wafer, 6 3/8” X 24"	
2	9100458BX	Poly Wafer, 6 3/8” X 24", Box Of 25	
3	9101467	Wire Wafer, 6 3/8” X 24" Ss	
4	9101467BX	Wire Wafer, 6 3/8” X 24" Ss, Box Of 25	
5	477996	Combo Wafer, 6 3/8” X 24"	
6	477996BX	Combo Wafer, 6 3/8” X 24", Box Of 25	
7	9103150K	Complete Brush Kit, Combo Wafer, 6 3/8” X 24" X 6' Wide	
8	9104641K	Complete Brush Kit, 1/2 Wire & 1/2 Poly , 6 3/8” X 24" X 6' Wide,	
9	9104403K	Complete Brush Kit, Poly Wafer, 6 3/8” X 24" X 6' Wide	
10	9104404K	Complete Brush Kit, Wire Wafer , 6 3/8” X 24" X 6' Wide	
11	9103151K	Complete Brush Kit, Combo Wafer, 6 3/8” X 24" X 8' Wide	
12	9104642K	Complete Brush Kit, 1/2 Wire & 1/2 Poly Wafer, 6 3/8” X 24" X 8' Wide	
13	9104405K	Complete Brush Kit, Poly Wafer, 6 3/8” X 24" X 8' Wide	
14	9104406K	Complete Brush Kit, Wire Wafer , 6 3/8” X 24" X 8' Wide	

Section 6. Decals

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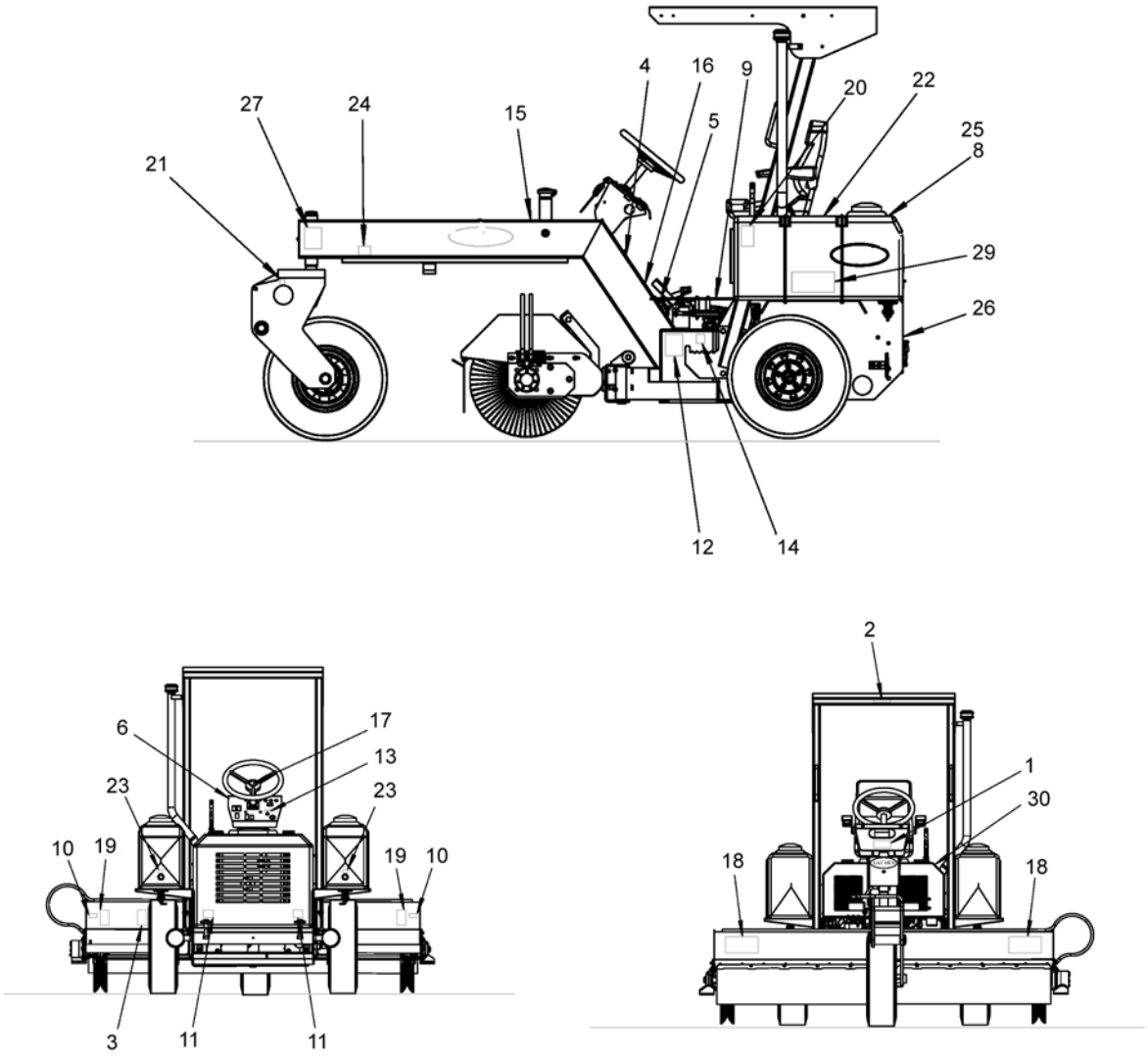
6-1 Decal Kit..... 6-2

PARTS LIST

Figure 6-1. Decal Kit



Item	P/N	Description	Qty
	377002	**Decal Kit**	1
1	100141	Decal, Hub Warning	1
2	100142	Decal, Name Plate	1
3	100143	Decal, Lubrication and Maintenance	1
4	100144	Decal, Operating Instructions	1
5	100145	Decal, Directional Control	1
6	100169	Decal, Dash Panel SM300	1
7	100204	Decal, Warning: Directional	1
8	151660	Decal, Long Life Coolant	1
9	432955	Safety Walk	1
10	436261	Reflector Tape, Red	2
11	443614	Decal, Danger: Rotating Fan	2
12	446387	Decal, Danger: Explosion Hazard	1
13	448811	Decal, California Warning	1
14	450148	Decal, Diesel Only	1
15	450155	Decal, Hydraulic Oil	1
16	460170	Pedal Pad	3
17	462606	Decal, Lay-Mor Steering Cap	1
18	467266	Decal, Warning: Stand Clear	2
19	472720	Decal, Danger: Pinch Point	2
20	472738	Decal, Danger: No Riders	2
21	472746	Decal, Tie Down	2
22	472753	Decal, Water Tank	2
23	472761	Decal, Water Tank Drain	2
24	472779	Decal, Steering Valve	1
25	472795	Decal, Radiator Cap	1
26	472811	Decal, Filter Screen	1
27	472829	Decal, Towing Instructions	2
28	472830	Decal, Front Fork	1
29	472837	Decal, Tow Instructions	2
30	472838	Decal, Caution: Park	1

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Section 7. Engine Components

7-1 Main Drivetrain Assembly 7-2
7-2 Radiator Assembly 7-4
7-3 Fuel System Assembly 7-6
7-3 Fuel System Assembly 7-6
7-4 Air Cleaner and Pre-Cleaner Assembly 7-8
7-5 Hood Assembly 7-10

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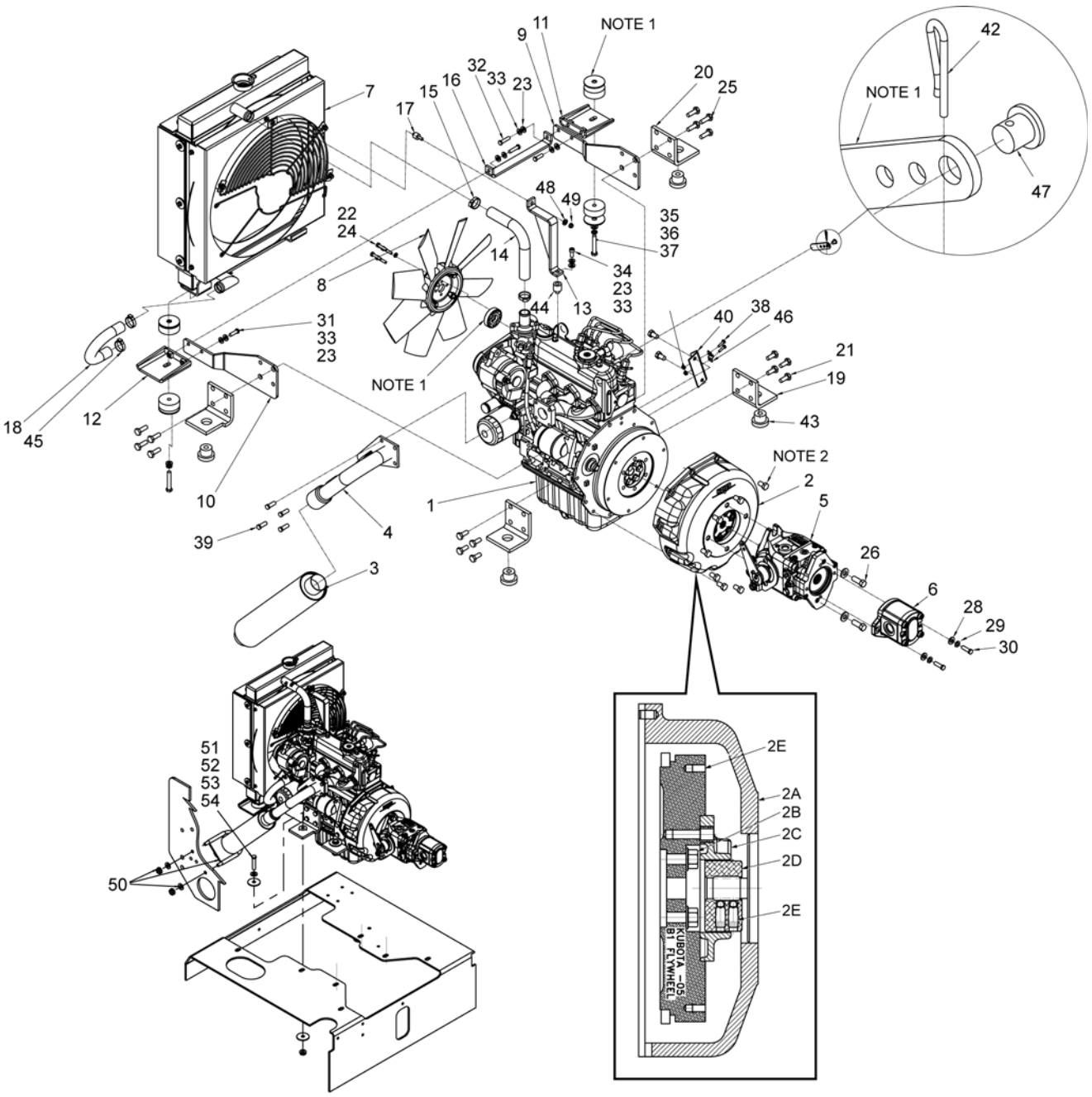
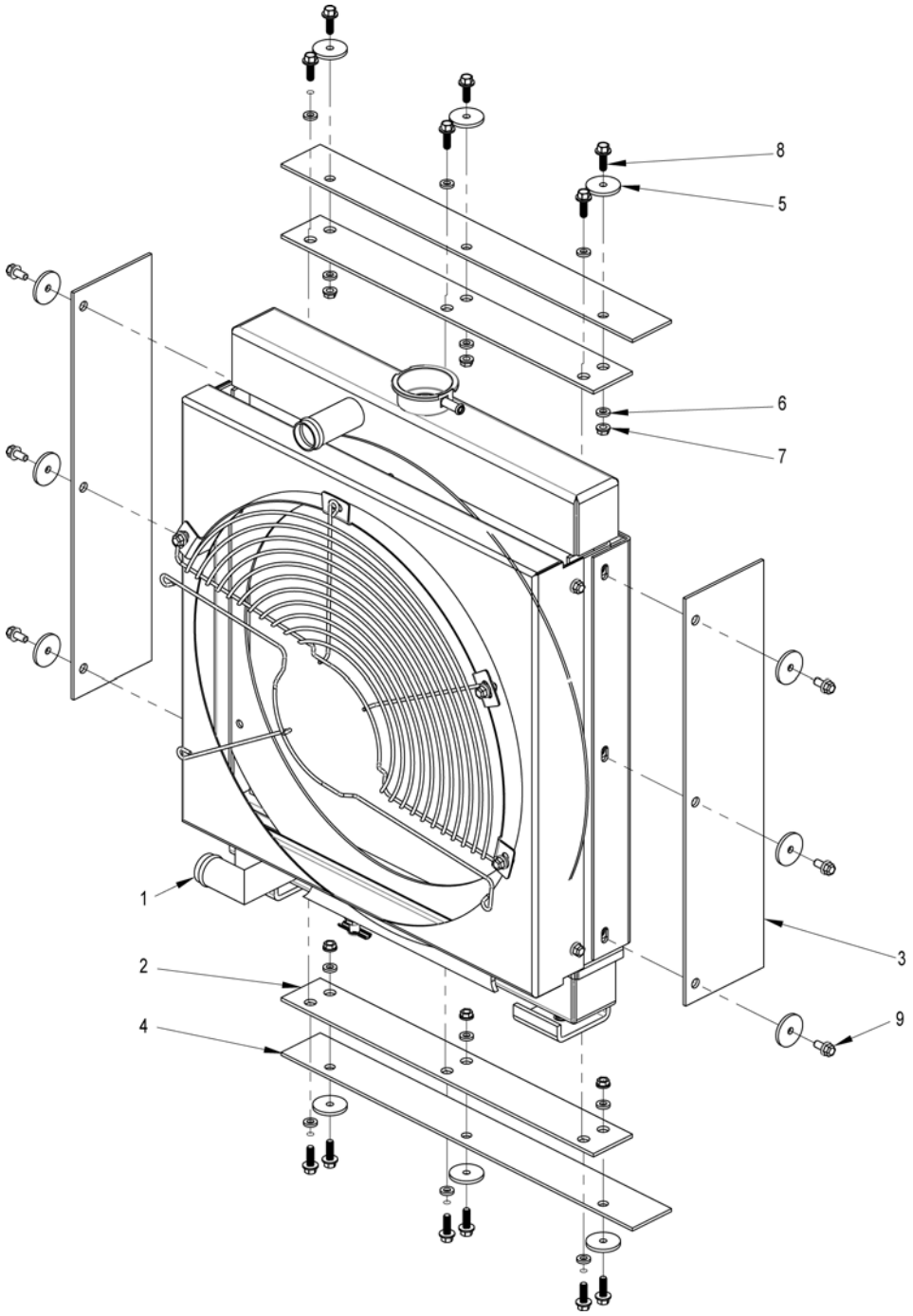
Figure 7-1. Main Drivetrain Assembly



NOTES:
1. SUPPLIED WITH ENGINE KIT
2. SUPPLIED WITH FLYWHEEL HOUSING

Item	P/N	Description	Qty
		Main Drivetrain Assembly	
1	100054	Engine Kit, Kubota 1505	1
2	100100	Flywheel Housing Kit, Sm300 (Consists Of The Following)	1
2A	9107112	Housing	1
2B	9107110	Bolt Kit	1
2C	9107114	Drive Plate	1
2D	9107113	Hub	1
2E	9107111	Dowel Pins	2
3	9101774	Muffler, Kubota 1505	1
4	376806	Str., Exhaust Header (6hc w/Kubota)	1
5	100065	Hydrostatic Pump, Sm300	1
6	9104033	Pump, Aux Gear - Sm300	1
7	100234	Radiator W/ Baffles Installed	1
8	100121	Fan, Sm300 W/ D1105 Eng	1
9	100109	Radiator Mounting Bracket, Left	1
10	100110	Radiator Mounting Bracket, Right	1
11	100127	Weldment Radiator Iso.	1
12	100128	Weldment Radiator Iso.	1
13	100174	Weldment Radiator Stiffener	1
14	100130	Radiator Hose, Upper	1
15	56424	Clamp, Hose	2
16	100133	Radiator Bracket	1
17	456806	Radiator Isolator	1
18	100131	Radiator Hose, Lower	1
19	376797	Mount, Engine Rear	2
20	376800	Mount, Engine Front	2
21	459486	Bolt	8
22	122191	Bolt	4
23	173193	Lock Washer	5
24	173192	Lock Washer	4
25	459487	Bolt	8
26	441774	Bolt	2
27	33800	Washer	2
28	33115	Washer	2
29	173194	Lock Washer	2
30	10107	Bolt,	2
31	10055	Bolt	2
32	10057	Bolt	2
33	33114	Washer	5
34	459453	Bolt	1
35	11323	Washer	2
36	11023	Lock Washer	2
37	10678	Bolt	2
38	441527	Bolt	2
39	404673	Bolt	4
40	9104569	Bracket, Throttle Cable	1
41	440628	Nut	2
42	459826	Clip	1
43	456459	Mount, Radiator Vibration Isolator	4
44	459818	Standoff, Radiator Mount	1
45	100207	Silicone Hose Clamp	2
46	457184	Clamp, Throttle	1
47	457192	Brass Retainer	1
48	11322	Washer	1
49	440636	Locknut	1
50	9101616	U-Bolt Muffler Clamp Assembly	1
51	100026	Bolt	4
52	011325	Washer	4
53	459842	Washer, Pin Retainer	8
54	100036	Locknut	4
55	100100	Flex Hub Assembly Kit (not shown)	1

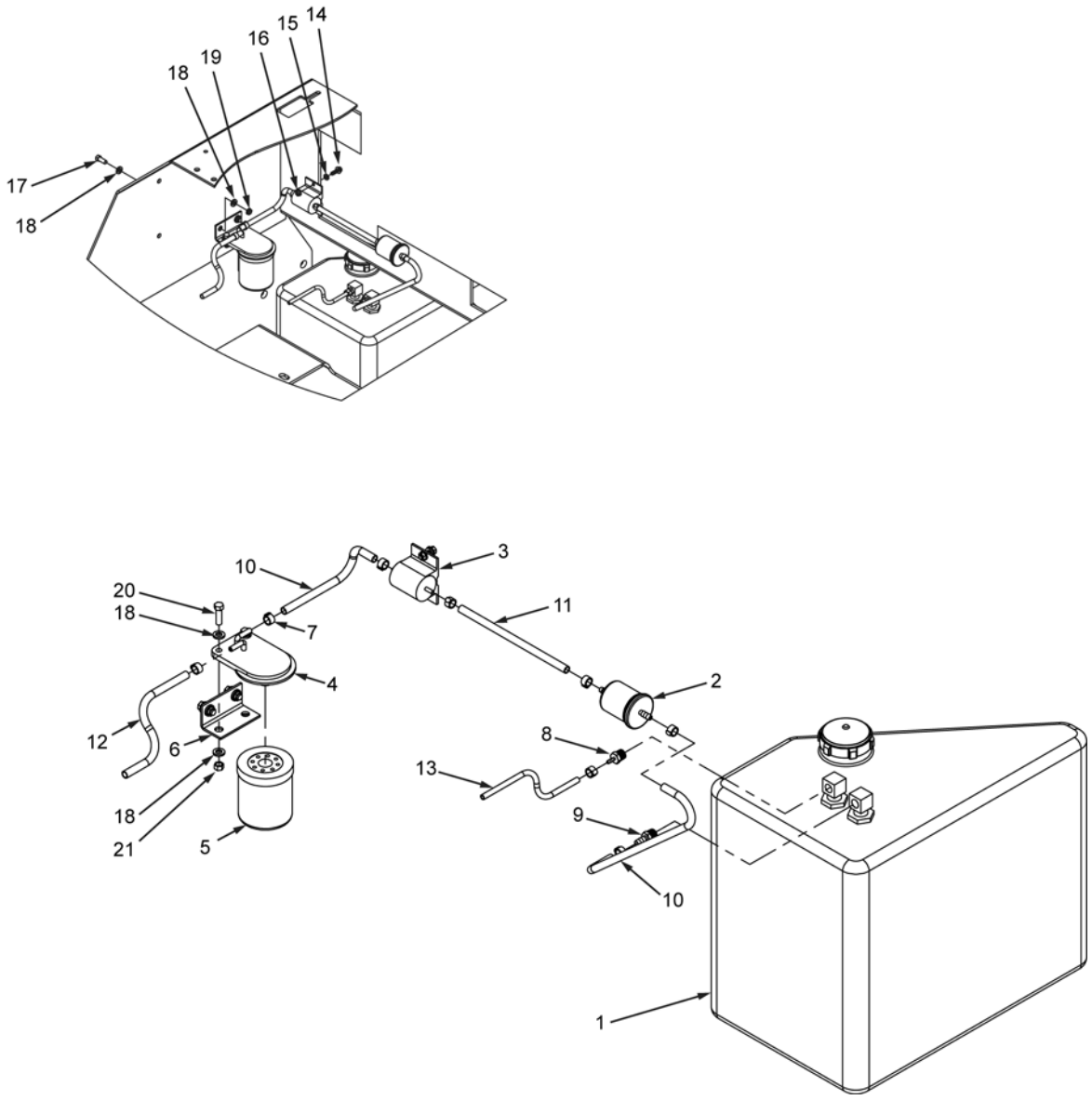
Figure 7-2. Radiator Assembly



Item	P/N	Description	Qty
		Radiator Assembly	
1	100063	Radiator	1
2	100108	Radiator Bracket	2
3	100194	Baffle	2
4	100195	Baffle	2
5	010299	Washer	12
6	011321	Washer	12
7	440636	Locknut	6
8	441550	Bolt	12
9	NO NUMBER	Screw (Supplied With Item 1)	6

PARTS LIST

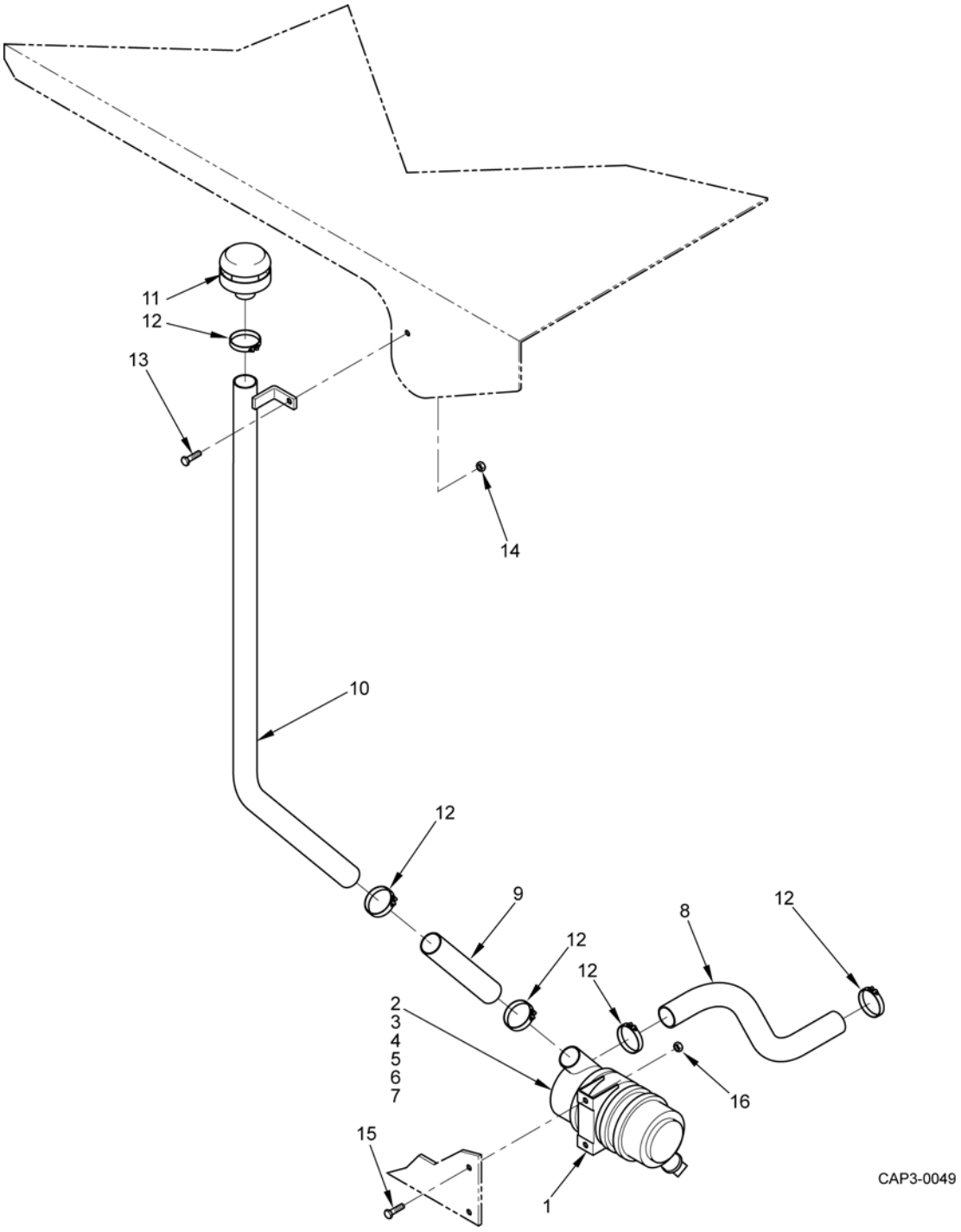
Figure 7-3. Fuel System Assembly



Item	P/N	Description	Qty
	100243	**Fuel System Assembly**	
1	376137	Fuel Tank, Plastic	1
2	9101624	Fuel Filter, In-Line	1
3	9101888	Fuel Pump	1
4	473199	Filter Mount	1
5	9102952	Fuel Filter, Spin-On	1
6	356949	Mount, Fuel Filler	1
7	029561	Hose Clamp	8
8	407189	Fitting	1
9	068528	Fitting	1
10	100151	Fuel Line, 7”	2
11	100152	Fuel Line, 10”	1
12	100153	Fuel Line, 24”	1
13	100147	Fuel Return Hose	1
14	441550	Bolt	2
15	011321	Washer	2
16	440636	Locknut	2
17	083485	Bolt	2
18	011322	Washer	8
19	083535	Nut	2
20	441600	Bolt	2
21	083493	Nut	2

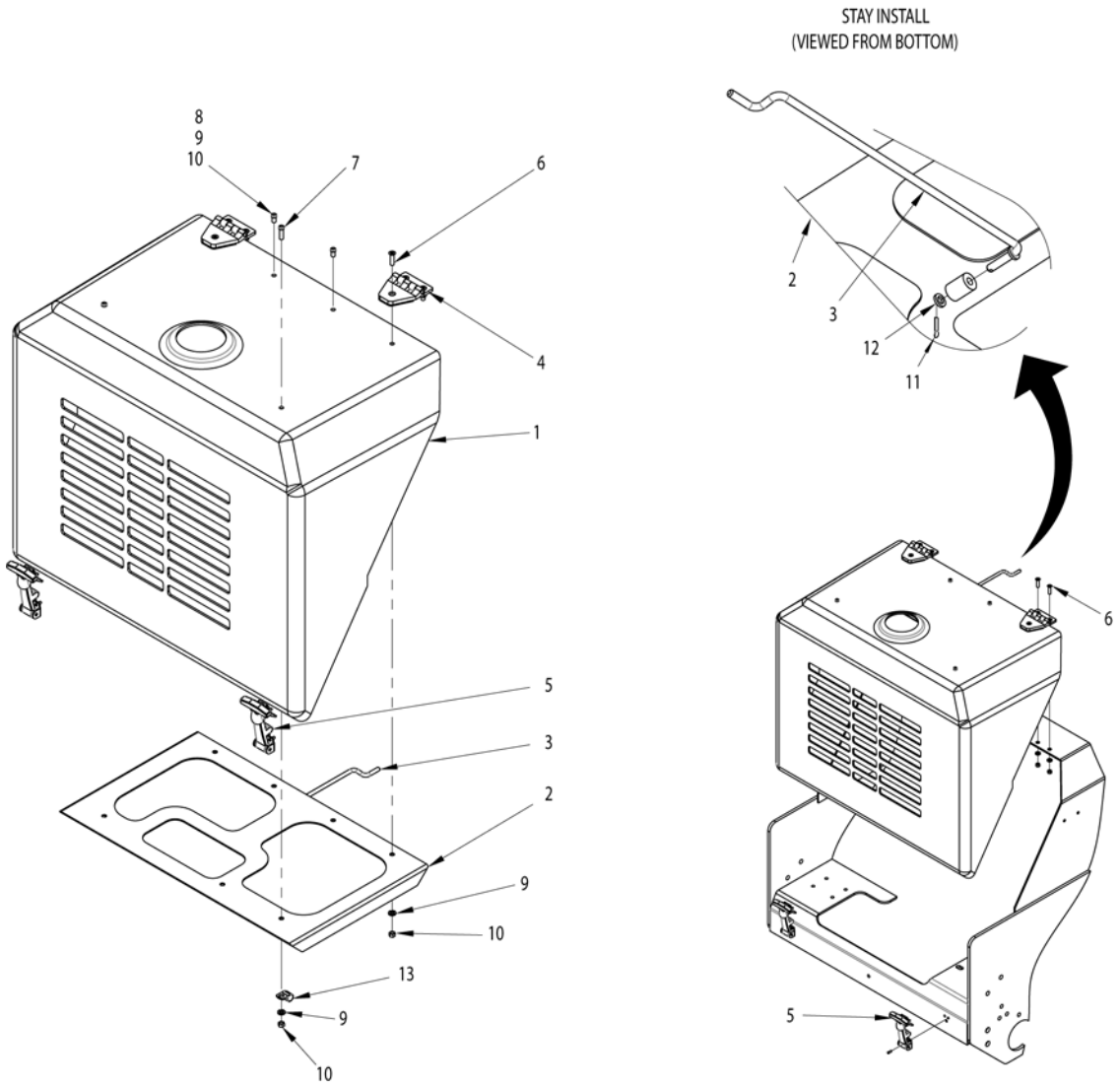
PARTS LIST

Figure 7-4. Air Cleaner and Pre-Cleaner Assembly



Item	P/N	Description	Qty
		Air Cleaner Assembly	
1	467480	Bracket, Mounting Air Cleaner	1
2	467472	Cleaner, Air	1
3	467498	* Element, Primary Air Cleaner (Included with Item 2)	1
4	467506	* Element, Safety Air Cleaner (Included with Item 2)	1
5	467514	* Valve, Vacuator (Included with Item 2)	1
6	467522	* Cover, Air Cleaner Housing (Included with Item 2)	1
7	467530	* Latch, Air Cleaner Housing (Included with Item 2)	2
8	467555	Hose, Intake	1
9	374785	Hose	1
10	376657	Pipe	1
11	467548	Pre-Cleaner, Air	1
12	V02026200	Clamp	4
13	441568	Capscrew	1
14	440636	Hex Nut	1
15	441618	Capscrew	2
16	083493	Hex Nut	2

Figure 7-5. Hood Assembly



Item	P/N	Description	Qty
	100247	**Hood Assembly**	
1	100175	Hood, Plastic	1
2	100117	Stiffener	1
3	100197	Support Rod	1
4	442269	Hinge	2
5	V63013300	Latch Assembly	2
6	442285	Bolt	6
7	472902	Bolt	2
8	472902	Bolt	2
9	010561	Lockwasher	8
10	010553	Nut	10
11	015123	Cotter Pin	1
12	010579	Washer	1
13	028993	Hose Clamp	2

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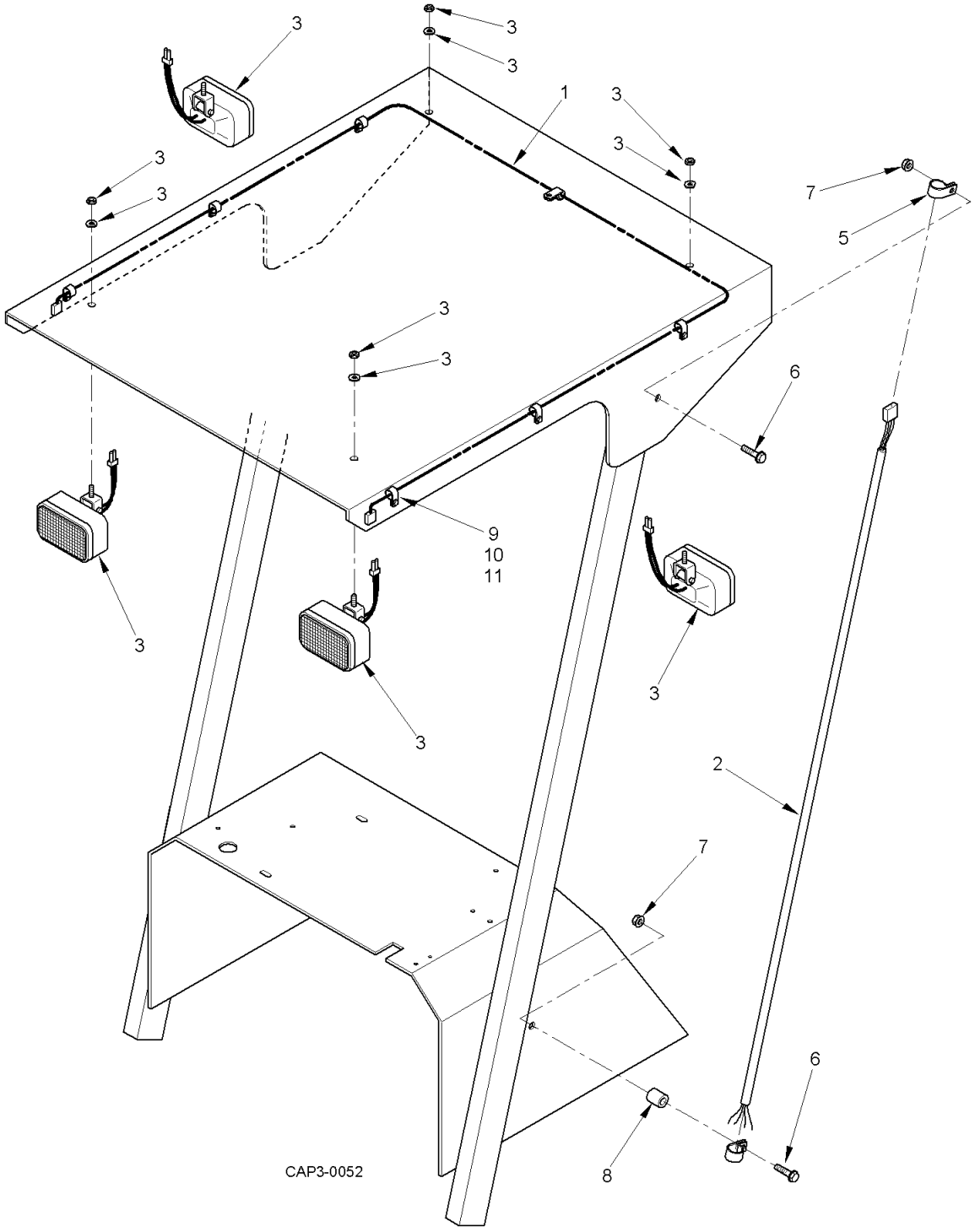
Section 8. Options

8-1 Light Kit (Front and Rear) 8-2
8-2 Water Tank Assembly 8-4
8-3 Sprinkler Assembly 8-6

PARTS LIST

PARTS LIST

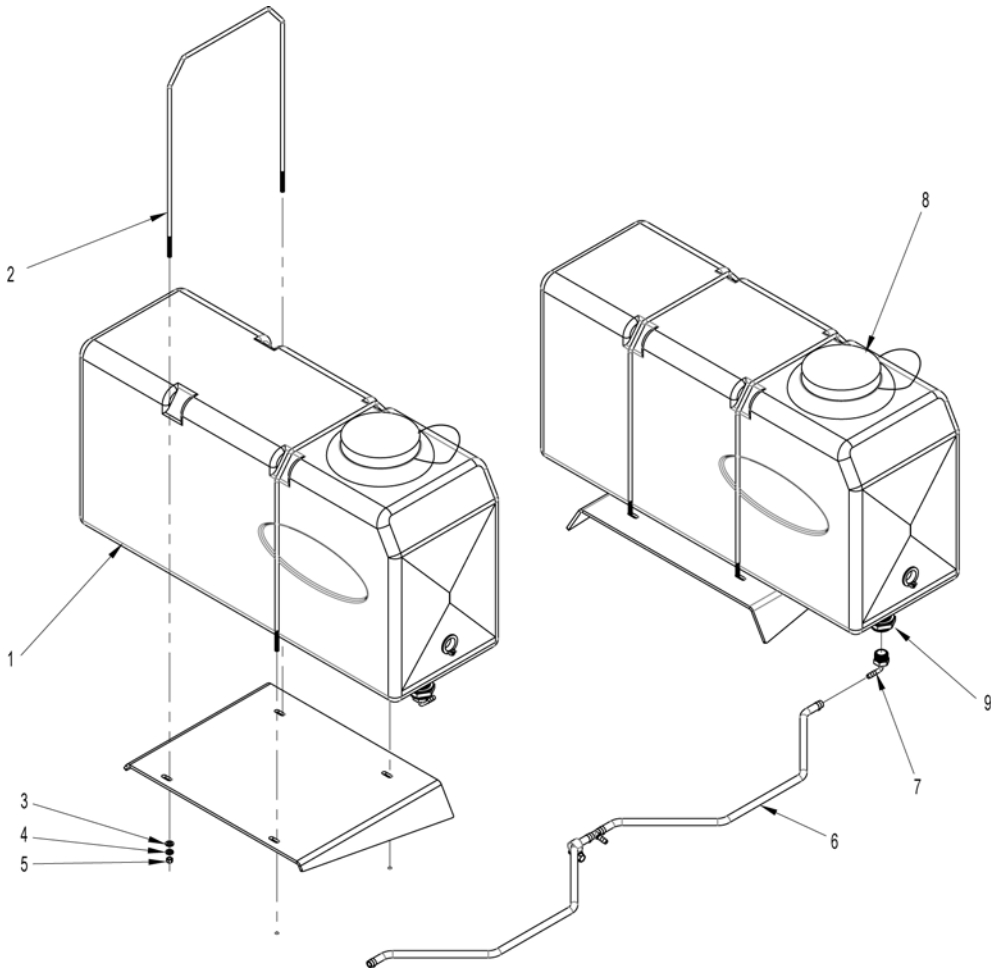
Figure 8-1. Light Kit (Front and Rear)



Item	P/N	Description	Qty
	379024	**Light Kit (Front and Rear)**	
1	379032	Harness, Light	1
2	377598	Harness, Light Power	1
3	373548	Assembly, Light with Terminal Ends	4
4	460139	Switch, 3-Position Off/On/On (Not illustrated)	1
5	028993	Clamp, Loop	2
6	441600	Capscrew	2
7	083535	Hex Nut	2
8	379115	Spacer	1
9	441550	Capscrew	7
10	440636	Hex Nut	7
11	070516	Clamp	7

PARTS LIST

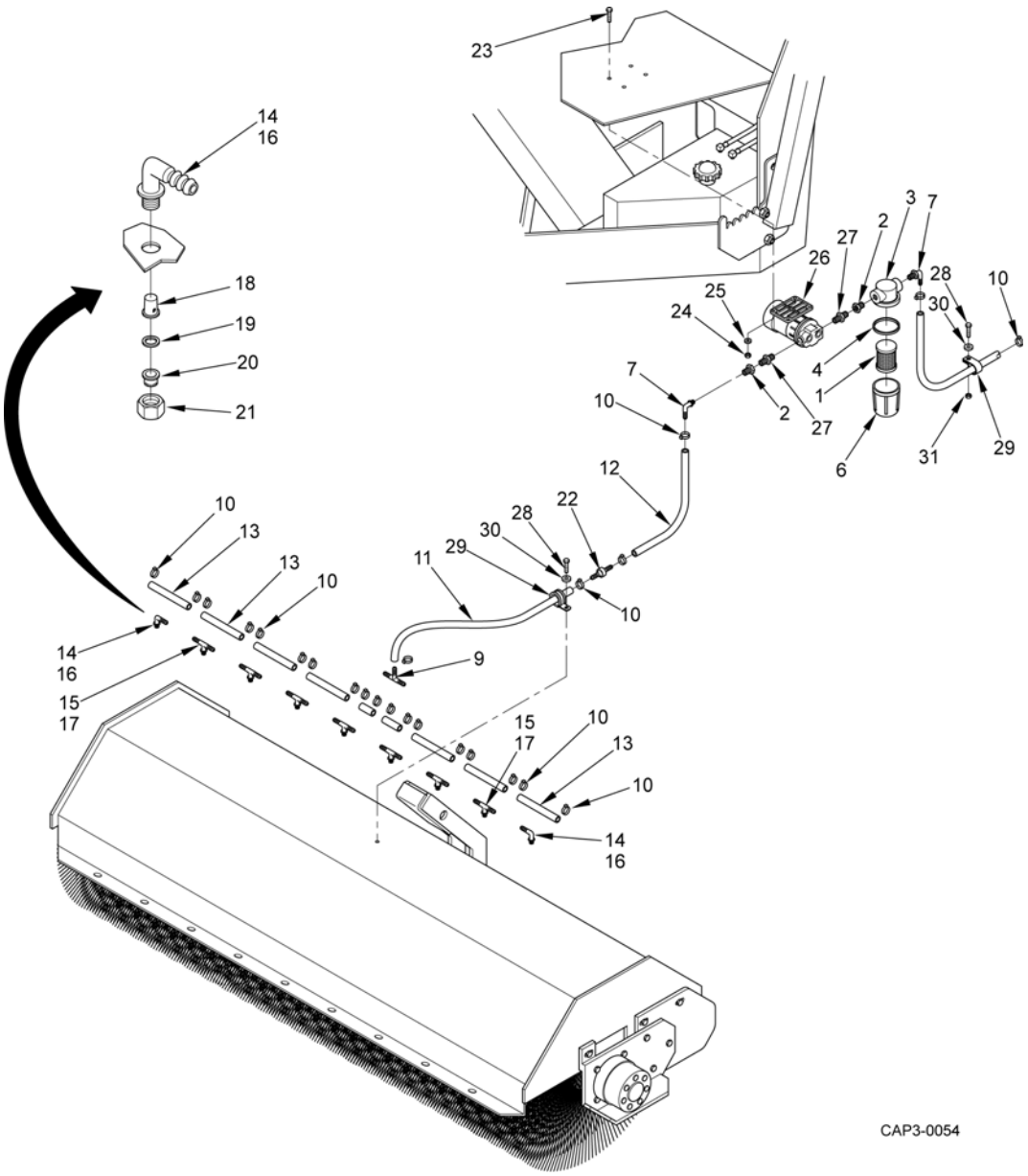
Figure 8-2. Water Tank Assembly



Item	P/N	Description	Qty
		Water Tank Assembly	
1		Tank	1
2	376913	Rod, Hold Down	4
3	011322	Washer	8
4	010561	Lockwasher	8
5	010553	Nut	8
6		Water Tank Hose Assembly	1
7	50925K115	Adapter, 90 Degree	1
8	9107089	Water Tank Lid (with lanyard)	2
9	9107090	Tank Bulkhead Fitting	2

PARTS LIST

Figure 8-3. Sprinkler Assembly



Item	P/N	Description	Qty
	374645	**Sprinkler Assembly - 6'**	
	376921	**Sprinkler Assembly - 8'**	
	374646	**Sprinkler Assembly - 6' with Black Tanks**	
	376922	**Sprinkler Assembly - 8' with Black Tanks**	
1	9104062	Screen, Suction Filter (Green)	1
2	9101535	Bushing, 1/2-MNPT x 1/4-FNPT Nylon	1
3	9102321	Head, Filter	1
4	9102322	Gasket, Filter Head	1
5		Not used	1
6	9102329	Bowl, Filter	1
7	9103017	Barb, 1/2-MNPT x 90º x 3/8", Plastic	1
8	477941	Elbow, 90º, .38NPT x 3/8", Plastic	1
9	447128	Tee, .37 I.D. Hose Barb	1
	9101507	Hose Kit for 6' Broom	
	9101588	Hose Kit for 8' Broom	
10	447466	* Clamp, Crimping Band -6 Hose	20
	447466	* Clamp, Crimping Band -6 Hose	24
11	447474	* Hose, .375" I.D. Low Pressure	A/R
12	447474	* Hose, .375" I.D. Low Pressure	A/R
13	447474	* Hose, .375" I.D. Low Pressure	A/R
14	9104621K	Assembly, Spray Nozzle Brass L-Body	2
15	9104620K	Assembly, Spray Nozzle Brass T-Body	5
	9104620	Assembly, Spray Nozzle Brass T-Body	7
16	9104059	* Body, 90º Spray Nozzle (Brass)	2
17	9104058	* Body, Tee Spray Nozzle (Brass)	5
	9104058	* Body, Tee Spray Nozzle (Brass)	7
18	V70007388	* Screen	7
	V70007388	* Screen	9
19	9104055	* Seal, Orifice Core	7
	9104055	* Seal, Orifice Core	9
20	9101539	* Orifice, (D-2) Standard	7
	9101539	* Orifice, (D-2) Standard	9
	9101834	* Orifice, (D-5) More Water	7
	9101834	* Orifice, (D-5) More Water	9
	9101832	* Orifice, (D-8) Most Water	7
	9101832	* Orifice, (D-8) Most Water	9
21	V70007488	* Cap, Brass	7
	V70007488	* Cap, Brass	9
22	459743	Valve, Anti-Leak Check	1
23	441568	Capscrew, 1/4-20NC x 1.00" Flange Whizlock	4
24	010272	Hex Nut, 1/4-20NC Flange Whizlock Gr. G	4
25	010280	Lockwasher, 1/4"	4
26	416826	Pump, Water	1
27	9101534	Nipple, .25 x 1.25" Plastic	2
	9101534	Nipple, .25 x 1.25" Plastic	1
28	441667	Capscrew, 3/8-16NC x 1.00" Flange Whizlock	2
29	461384	Clamp, .812 I.D. with .406 Bolt Hole Vinyl	2
30	011031	Flat Washer, 3/8" Pl.	2
31	083501	Hex Nut, 3/8-16NC Flange Whizlock	1

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Section 9. General Service Information

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9-3 Broom Core Replacement 9-5
9-4 Broom Wafer Replacement 9-5
9-5 Replacement of Convoluted (Spacer-less) Wafers 9-5
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All data and information listed herein is correct to the best of our knowledge and belief, and has been compiled from reliable sources of information. However, LayMor cannot assume any responsibility for possible errors.

9-1. Specifications

ENGINE	
Make & Model	Kubota D1105
Displacement	68.53 cu. in. (1.123 L)
Cylinders	3
Fuel Type	Diesel
Cooling System	Water Cooled
Gross Intermittent HP (kw) /RPM	37.5 (28.0)/3000
High idle	3000 RPM
Low Idle	800-900 RPM
Electrical System	12 VDC
Battery CCA (Group Size)	675 (78-60)
HYDRAULIC SYSTEM	
Hydraulic Fluid Recommendation	Mobil U46
HYDRAULIC CYLINDERS	
Steering Cylinder Size	1.75 in. X 21.25 in.
Steering Cylinder Stroke	8.00 in.
Broom Angle Cylinder Size	1.75 in. X 19.50 in.
Broom Angle Cylinder Stroke	9.00 in.
Broom Lift Cylinder Size	2.00 in. X 11.50 in.
Broom Lift Cylinder Stroke	6.00 in.
AUXILIARY PUMP	
Type	Gear
Displacement	0.915 cu. in./rev (15 cc/rev)
Pressure (maximum)	3626 PSI (250 bar)
Maximum speed	4000 RPM
BROOM MOTORS	
Displacement	15.3 cu. in./rev (251 cc/rev)
Pressure (maximum)	2250 PSI (155 bar)
Maximum speed	200 RPM
TRANSMISSION	
Type	Piston
Displacement	0-1.25 cu. in./rev (0-20.3 cc/rev)
Pressure (maximum)	5000 PSI (345 bar)
Maximum speed	3600 RPM
WHEEL MOTORS	
Type	Roller Stator
Displacement	18.3 cu. in. (300 cc)
Speed at max RPM	12.6 gal (3.3 L)
STEERING	
Type	Single Front Wheel with Hydraulic Power Steering
Turning Radius	

SERVICE

BRAKES	
Service	Hydrostatic
Secondary	Single Drum Brake
Towing	Hydraulic Drum Brakes with Surge Actuator
CAPACITIES	
Fuel Tank	9 Gal (34 L)
Hydraulic System	21 Gal (79.5 L)
Engine Crankcase	1.59 Gal (6.0 L)
Engine Coolant (50/50 Extended Life)	1.06 Gal (4.0 L)
Wheel Disconnects	8 fl. oz. (236 cc) each
TIRES	
Tire Size	P205/75R-15
Inflation Pressure (Cold)	35 PSI
Wheel Size	14 in. X 6 in.
Loaded Radius	10.8”
DIMENSIONS	
Length	138 in.
Width (8 ft. Broom)	98 in.
Width (6 ft. Broom)	77.0 in.
Height	88 in.
WEIGHT	
Dry Weight	2100 lbs.
SPEED	
Maximum	7 MPH
STEERING	
Maximum angle	90° each way
BROOM ANGLE	
Limits	45° both ways

SERVICE

9-2. Torque Recommendations

CHASSIS	
Front Fork Retaining Bolt (Loctite 272 recommended)	100 ft. lbs.
Steering Wheel Nut	30-35 ft. lbs
Lug Nuts	60 ft. lbs.
HYDRAULIC COMPONENTS	
Hydrostatic Pump Mounting Capscrews	75 ft. lbs.
Hydrostatic Motor Mounting Capscrews	75 ft. lbs.
Hydraulic Pump Mounting Capscrews	75 ft. lbs.
HYDRAULIC CYLINDERS	
Piston Nuts	160-180 ft. lbs
GROUND DRIVE	
Hydraulic Motor to Lockout Hub	100 ft. lbs.
Lockout Hub to Frame	100 ft. lbs.
Lockout Hub to Drum Nut	250 ft. lbs.

9-3. Broom Core Replacement

1. Lower broom until it just touches the ground.
2. Remove three capscrews from front of broom motor mount assembly.
3. Remove three capscrews and remove broom bearing carrier assembly.
4. Remove entire motor mount assembly (with hoses attached) from square hole in end of core, and set aside.
5. Clean any debris or dirt from seal area of broom motor.
6. Start sweeper engine and raise broom head.
7. Pull core assembly from under broom head.
8. Reverse steps to reinstall broom core.
9. Torque capscrews in accordance with Appendix A.
10. Start sweeper engine and engage broom rotation. Check rotation of core assembly before returning unit to service.

9-4. Broom Wafer Replacement

1. Remove two capscrews from removable cap plate (dual motor applications) or four flange-head capscrews that bolt the idler bearing shaft to the core.
2. Stand core on end with removable cap plate or idler bearing shaft end up.
3. Clean any dirt or debris from bearing.

9-5. Replacement of Convoluted (Spacer-less) Wafers

1. Remove worn wafers from core. If wafers cannot be slipped off the core, cut wafer center ring between core tube with a torch.
2. Install new wafer onto core with drive pins straddling one of the core tubes.
3. NOTE: When installing a 1/2 wire-1/2 poly wafer mix, make sure that a poly wafer is on each end.
4. Install the next wafer on the core by flipping it over an rotating the wafer 1/3 of a turn. See illustration below. If the preceding wafer installed was number (2) in the illustration, then the next wafer to go on the core would be placed with the drive pins as shown in No. 3.
5. Use a rubber mallet to tap the wafers together to ensure that the proper quantity of wafers can be installed on the core.

9-6. Neutral Creep Adjustment

When the sweeper moves slightly either forward or backward when in Neutral, perform the following steps to eliminate neutral creep.

1. Shut down sweeper.
2. Using 10 mm wrench, loosen jam nut (1).
3. Using 10 mm wrench, turn adjustment nut (2).
4. Start sweeper and test for creep. If condition still exists, repeat adjustment.

Section 10. Hydraulic System Servicing

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10-2 Troubleshooting 10-3
10-3 High Pressure Filter Replacement 10-3
10-4 Drive Motor Seal Test 10-4
10-5 Hydraulic Cylinders Servicing 10-4
10-6 Hydraulic Pressure Relief Valve Adjustment 10-4
10-7 Broom Drive Motor Test 10-8

All data and information listed herein is correct to the best of our knowledge and belief, and has been compiled from reliable sources of information. However, LayMor cannot assume any responsibility for possible errors.

10-1. Introduction

This chapter provides information required to service the hydraulic components of the sweeper. The adjustment and disassembly procedures described in this section can be performed without affecting the warranty for the sweeper when performed in clean conditions by qualified service personnel. Disassembly of the unit beyond the stages described in this manual without express permission of Lay-Mor may void the warranty.

When performing any type of service on hydraulic components, strict cleanliness of the work area, tools, cleaning rags, and components is required. Dirt of other contamination introduced during assembly or servicing is a major cause of premature failure in high-pressure hydraulic equipment. The importance of a clean work environment cannot be overemphasized.

10-2. Troubleshooting

PROBLEM	POSSIBLE CAUSE	CORRECTION
1. Sweeper will not move forward or reverse.	a. Hydraulic fluid supply low.	a. Check level and add fluid as necessary.
	b. Filter clogged.	b. Replace filter element.
	c. Hydraulic fluid too heavy (viscous).	c. Replace fluid with proper viscosity type.
	d. Control linkage out of adjustment or unfastened.	d. Check linkage for proper adjustment. Ensure linkage is not binding.
	e. Low charge pressure should be 60-100 PSI.	e. See items f, g, h, and i below.
	f. Charge pump key sheared.	f. Inspect charge pump. Repair as necessary.
	g. Charge pump relief valve malfunctioning or damaged.	g. Remove relief valve and inspect parts and seat. Repair as necessary.
	h. Charge pump gears worn or scored.	h. Remove charge pump and inspect. Replace defective parts. If excessive scoring is indicated, remove complete pump and disassemble, clean, and repair as necessary.
	i. Internal charge pump damaged.	i. Disassemble charge pump and repair as necessary.
	j. Drive coupling broken.	j. Inspect coupling for sheared spline, key, or broken chain.
	k. Relief valve stuck open.	k. Remove and inspect relief valve. Clean or replace as necessary.
	l. Malfunctioning or damaged check valve.	l. Remove and inspect check valve. Replace as necessary.
2. System noisy.	a. Air in system.	a. Bleed air from system.
	b. Loose suction line.	b. Tighten fittings.
	c. Clogged suction filter.	c. Replace filter element.
	d. Internal pump or motor damage.	d. Disassemble, inspect, and repair as necessary.
3. Sluggish response to acceleration or deceleration.	a. Air in system.	a. See items 1a, 1b, 1c, and 2b above.
	b. Low charge pressure.	b. See items 1f, 1g, and 1l above.
	c. Internal pump or motor wear or damage.	c. Test motor/pump - block pump lines and check pump pressure. If OK, replace or repair motor. If bad, repair or replace pump and motor.
	d. Relief valve dirty or damaged.	d. Remove, clean, or replace.
4. Sweeper “creeps” forward or backward when in neutral.	a. Creep adjustment required.	a. Perform creep adjustment (para. 9-6.)

10-3. High Pressure Filter Replacement

To locate the High Pressure Filter raise the engine hood and look to the right side of the engine in front of the battery. The Filter Assembly is bolted to the inside of the frame cowl.

The high pressure filter element should be changed twice per year and any time a main pump or either rear wheel drive motor is replaced. Remove bottom Cap/Nut Assembly to gain access into the filter housing to remove the filter element. Be sure the o-ring is in place before reassembly.

10-4. Drive Motor Seal Test

Inspect drive motors for any signs of hydraulic fluid leaks. If leakage is observed, replace seals.

10-5. Hydraulic Cylinders Servicing

1. Push gland back into cylinder and remove retaining ring collar.
2. Grasp the rod (making sure not to scratch or damage it) and pull from cylinder barrel. The end gland will come out with the rod and piston assembly.
3. Loosen and remove locknut on the end of rod.
4. Remove piston and gland. Clean and inspect all parts for wear.
5. Install cylinder repair kit plus any other parts that need to be replaced.

   NOTE:
   It is recommended that all seals and o-rings be expanded in warm oil before installation.
6. After seals are in place coat seals with grease prior to assembling cylinder components.
7. Torque piston nut to 210 ft.lbs.
8. Reassemble cylinder.
9. Pressure check cylinder prior to installation on units if possible.

10-6. Hydraulic Pressure Relief Valve Adjustment

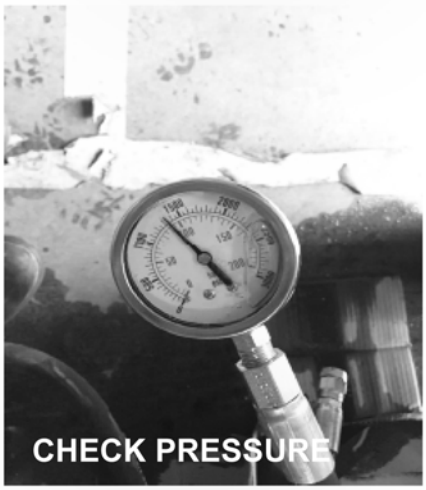
Tools Required

1. SAE ½-inch box wrench or socket
2. 4 MM Allen head wrench or bit driver
3. 15/16-inch SAE offset wrench
4. 7/8-inch socket or wrench
5. Pressure gauge (LayMor PN 10000033)
6. Face seal Plug - 08 (LayMor PN 10000038)
7. Paint marker
8. Cleaning Solvent

Checking Manifold Pressure

1. Remove hydraulic hose at BMA located on manifold using a 15/16-inch SAE offset wrench.
2. Install pressure gauge at BMA using 15/16-inch SAE offset wrench. Cap off existing hose from broom motor to BMA using a 08 face seal plug using 15/16-inch and 7/8-inch SAE wrenches.
3. Ensure all connections are tight and start the engine. Set the throttle at low idle. Engage the broom motor switch for no more than 5 seconds and record PSI reading. The reading should read between 1700 (±
4. 100 PSI) at low idle.
5. With engine still running and broom motor switch off increase the throttle to the max position. Engage the broom motor for no more than 5 seconds and record PSI reading. The reading should read 2100 (± 100) PSI
6. If the readings are not within specification shut the engine off and adjust the pressure relief valve.

DISCONNECT HOSE



SERVICE

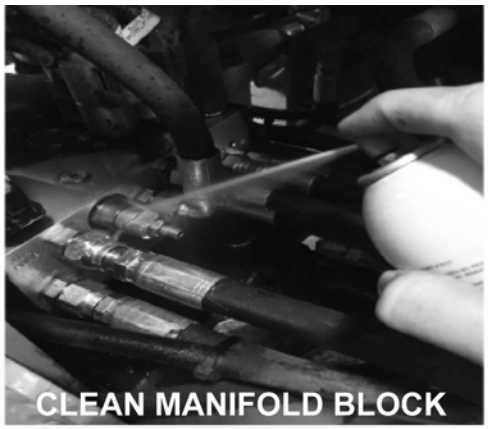
Adjustment Procedure

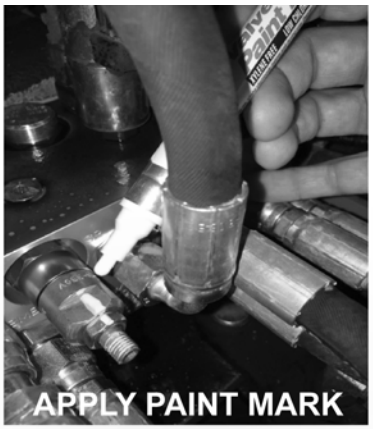
NOTE:
Rotate clockwise to increase pressure and counter-clockwise to reduce pressure. It is recommended that adjustments be made in 1/4 turn increments.

1. Clean off hydraulic manifold to access pressure relief valve using cleaning solvent.
2. Place a reference mark on the pressure relief valve and adjustment stem using a paint marker.
3. Loosen jam nut on the pressure relief valve counter clockwise using a ½-inch socket or wrench.

NOTE:
Laymor has identified that the current hydraulic pressure at the pressure relief valve is incorrect for units delivered between March 1, 2014 and March 24, 2014. In order to prolong the life and efficiency of the broom motor, the pressure relief valve should be adjusted to 1650 PSI cracking pressure, 1900 PSI Max Operating Pressure 2100 (± 100) PSI dead Head pressure. For these units, loosen the valve stem one complete revolution counter-clockwise using a 4 MM Allen wrench or drive bit. Make sure to use your paint mark from before as a reference.

4. Adjust pressure relief valve as necessary, using paint mark as a reference.
5. Tighten the jam nut up finger tight.
6. Stabilize the valve stem with the 4 MM drive bit or Allen wrench. Turn the jam nut clockwise with the ½-inch box wrench until firmly snug.


CLEAN MANIFOLD BLOCK


APPLY PAINT MARK

LOOSEN JAM NUT

ADJUST VALVE STEM

TIGHTEN JAM NUT

SERVICE

10-7. Broom Drive Motor Test

Prior to testing hydraulic motor check the auxiliary relief pressure and make sure it is set at 2,500 psi. For single broom drive, follow the procedure outline below. For dual broom drive, disconnect the hoses going to one of the motors and plug the hoses. Loop a hose between the motor's fittings to prevent oil from being released. Follow the procedure outlined below to test the motor then reconnect hoses and disconnect the other motor and repeat thet test.

1. Remove the inlet hose to the broom rotation valve and install a 7/8-inch JIC tee fitting between the hose and the broom drive valve.
2. Install a 3,000 PSI gauge in the tee fitting.
3. Start the engine and run it at half throttle.
4. Move the broom raise and lower lever to force the broom onto the ground. When broom is forced onto the ground, center the broom raise and lower lever so that down pressure is maintained on the broom.
5. Ease the broom rotation lever into detent and raise the engine speed to 3,000 RPM.
6. Pressure reading on the gauge should be 2,250 PSI. If the broom drive motor cannot maintain this pressure, remove it and check for a failed output shaft, worn drive coupling, or a sheared or missing square key on the broom motor shaft. If none of the above failures have occurred the motor is leaking internally and must be replaced.

Section 11. Brake/Wheel System Servicing

11-1 Introduction 11-2
11-2 Wheel Disconnect and Brake Assembly Servicing 11-3
11-3 Surge Brake Actuator Maintenance 11-4
11-4 Surge Brake Master Cylinder Servicing 11-6

All data and information listed herein is correct to the best of our knowledge and belief, and has been compiled from reliable sources of information. However, LayMor cannot assume any responsibility for possible errors.

11-1. Introduction

This chapter provides information required to service the brake and wheel components of the sweeper. The adjustment and disassembly procedures described in this section can be performed without affecting the warranty for the sweeper when performed in clean conditions by qualified service personnel. Disassembly of the unit beyond the stages described in this manual without express permission of Lay-Mor may void the warranty.

11-2. Wheel Disconnect and Brake Assembly Servicing

1. To ensure maximum bearing life, install the unit in a clean environment and make sure that it is free from any contaminants.
2. The chamfered end of the sleeve is to be assembled to the chamfered end of the lock-out shaft. The non-chamfered end of the sleeve assembles onto the hydraulic motor shaft. An o-ring, (item #12 page 4-2) is to be installed between the hydraulic motor and the unit.
3. To lubricate unit prior to operation, remove oil plugs and fill1OW40 motor oil through top hole until the oil overflows through second hole located 90° from top. Install oil plugs after filling with oil. Approximately 1/2 pint of 1OW40 oil will be required. At low temperatures, disengagement and engagement may be more difficult. Running the unit to warm the oil will allow engagement to occur in a normal manner.
4. To install the wheel hub (item #8 page 4-3) the handle (item #12 page 4..4) must be removed. A standard tool for removal of the snap ring (item #13 page 4-4) must be used. For positive locking of the hub, a locknut (item #10), and lock washer (item #9 page 4-3) are used. Make sure the hub is fully seated on the spindle to prevent damage to the keyway, tighten to 250 ft.lbs. Reinstall the handle and snap ring prior to operation.
5. The sweeper should be properly braked or blocked when the operator or installer is working with the bearing package.
6. To engage the unit, the operator must jog the hydraulic motor forward and backward with a quick stop/start motion. Full engagement occurs when the handle is within 1/16" of the bottom of the slot in the spindle. The wheel must rotate slightly for the shaft to spring into the correct position. The operator should ensure that full engagement has occurred before the sweeper is placed back in service. Failure to do this may damage the splines.
7. To disengage the unit, the hydraulic motor must be off. The handle is to be pulled and rotated 90° and inserted into the slot in the upper portion of the spindle. If the handle will not easily disengage, the motor should be jogged rapidly back and forth in the same manner as for engagement. In some conditions, it may be necessary to move the sweeper by hand so there is a slight wheel rotation.

11-3. Surge Brake Actuator Maintenance

The "surge" or "push" of the sweeper toward the tow vehicle during deceleration automatically synchronizes the sweeper brakes with the tow vehicle brakes. As the sweeper pushes against the vehicle, the actuator telescopes together and applies force to its master cylinder, supplying hydraulic pressure to the sweeper brakes.

To get the most benefit from your surge actuator, follow a few simple precautions and common sense in caring for the surge actuator and your entire sweeper brake system.

- DO NOT submerge the actuator. Internal corrosion may result and cause brake failure. Salt water, granular fertilizers, and other corrosive materials are destructive to metal. To minimize the damaging effect of corrosion on the braking system used under corrosive conditions, we recommend that the actuator be externally flushed after use with a high pressure water hose. Be sure to lubricate all moving parts after the unit has dried.
- Whenever the unit will be out of service for an extended period of time, or after hard use, remove the brake drums and clean inside the brakes.
- Use only fresh brake fluid from a sealed container. DO NOT reuse fluid. After filling and bleeding, remember to refill the actuator. Failure to maintain an adequate fluid level may cause brake failure.
- Lubricate actuator by applying motor oil to the coupler components and internal rollers to keep them moving freely and to prevent corrosion.

Pre-Towing Checks

Before towing the sweeper, it is recommended to perform the following checks.

1. With the tongue horizontal, check that the brake fluid reservoir is three-quarters full of DOT-3 brake fluid. Check for leaks and repair as required.
2. Examine the actuator for wear, bent parts, corroded/seized parts, or other damage. Have the affected components replaced. Check to determine that the actuator mounting bolts are tightened to eighty (80) ft.lbs. torque using a torque wrench.
3. Test the actuator and brake function. Actuator travel over one inch indicates that the brakes need adjustment, the Master Cylinder is bad, there is a leak in the brake system, or the actuator has been structurally damaged. Actuator travel is the distance the coupler case assembly moves rela- tive to the outer case during backing. Fix or adjust brakes as required.
4. The only adjustments on the 2" actuator itself are the self-locking nuts on the two roller bolts. Tighten the locknuts just to zero free-play between the outer case and the coupler case, and then back the locknuts off one half tum. Over tightening will restrict proper surge operation.
5. A film of clean grease on the ball will minimize squeaking. Wipe the ball clean and renew film each time the sweeper is towed.

Brake Fluid Filling and Bleeding

Air trapped in the brake lines will greatly reduce your braking efficiency. It is important to bleed the brakes whenever fluid is added or changed.

CAUTION:
DO NOT allow brake fluid to contact painted surfaces since it will damage the finish.

1. Remove the master cylinder's cap and fill the reservoir to three-quarters full with DOT-3 brake fluid. Wipe up any spills immediately and wash the area with water.
2. Bleed the brake system with a pressure bleeder. Pressure bleeding equipment simplifies the pro- cess and is available at your local automotive supply store. Use the instructions provided with the pressure bleeder.

CAUTION:
DO NOT use the actuator's break-away lever or cable to bleed the brake system.

3. Install a bleeder hose on the bleeder screw of the right hand wheel cylinder from the actuator.
4. Submerge the other end of the hose in a glass container of brake fluid, so that air bubbles can be observed.
5. Open the bleeder screw. Brake fluid and or air bubbles will flow into the jar. Let brake fluid flow until no more bubbles are observed. Close the bleeder screw.
6. Repeat the above process on the left hand wheel cylinder until no more bubbles are observed. Be sure to close the bleeder screw securely when the wheel cylinders are fully bled.
7. During the bleeding process, replenish the master cylinder reservoir's brake fluid so that level does not fall below half full. This will ensure that no air is drawn into the system.
8. After all brakes are bled, again make sure that the master cylinder reservoir is filled to three- quarters full before operating. Check that the filler cap gasket is not tom or damaged. Screw the filler cap and gasket into the master cylinder cover. The filler cap only needs to be finger tight.

11-4. Surge Brake Master Cylinder Servicing

Disassembly

1. Refer to parts breakdown for disassembly and assembly.
2. Disconnect brake line and remove master cylinder.
3. Clean the outside of the cylinder, and remove the filler cap and diaphragm. Pour out any brake fluid that may remain the cylinder or reservoir.
4. Remove the brake line fitting from the forward end of the cylinder.
5. Remove the piston assembly, cup, spring, check valve, and valve seat from the cylinder bore.

Cleaning, Inspection, and Repair

1. Clean all master cylinder parts in clean denatured alcohol, and inspect the parts for wear or damage, replacing them as required. When using a master cylinder repair kit, install of the parts supplied.
2. Check the ports and vents in the master cylinder to make sure that all are open and free of foreign matter.
3. A leaf-type valve is riveted to the front end of the piston. If this valve is loose or has moved so that the piston ports are open, replace the piston.
4. Inspect the cylinder walls for scores or rust, and recondition them if necessary. Hone the cylinder walls no more than necessary (0.003" maximum). Oversize pistons and cups are not available for excessively honed cylinders.
5. Remove any burrs or loose metal that may have resulted from the honing operation, and clean the cylinder with denatured alcohol.

Assembly

1. Dip all parts except the master cylinder body in clean heavy duty brake fluid.
2. Install the brake line fitting on the cylinder and tighten securely.
3. Install the valve seat, check valve, spring, cup, and piston assembly in the cylinder bore.
4. Mount master cylinder on tractor and connect brake line.
5. Bleed master cylinder and entire system of entrapped air.

Appendix A. Torque Requirements

A-1. When to Use Torque Limits

When a torque is not specified in an individual work package, use the procedures in this work package to determine proper torque limits and use of adapters with torque wrenches.

A-2. When To Use Adapters With Torque Wrenches

When an adapter is necessary due to space or type of fitting being torqued, it must be determined how the adapter changes the amount of force applied. If the adapter increases or decreases the distance from the drive of the torque wrench to the fitting being torqued, an equation must be used to compensate for the difference.

A-3. How To Use Adapters With Torque Wrenches

The following abbreviations apply to the below procedures:

DT = Desired Torque
LT = Length of Torque Wrench
AL = Adapter Length
AT = Applied Torque

1. If the adapter used decreases the distance between the center of the torque wrench handle and the center of the drive, first find the desired torque for the fitting, then calculate as follows:

    a. Multiply DT by LT.

    b. Subtract AL from LT.

    c. Divide the first answer by the second answer to find AT.

    d. If the adapter used increases the distance between the center of the torque wrench handle and the center of the drive, first find the desired torque for the fitting, then calculate as follows:

    e. Multiply DT by LT.

    f. Add AL and LT.

    g. Divide the first answer by the second answer to find AT.

A-4. How to Use Torque Tables

1. Measure the diameter of the bolt to be torqued.

2. For Society of Automotive Engineers (SAE) fasteners, determine the threads per in. by counting the threads. For metric fasteners, determine the thread pitch using a thread pitch gage.

3. Determine the type of markings on the bolt you are torquing by comparing the markings on the head of the bolt with the chart below.

4. Determine if this will be a wet or dry torque as follows:

    a. Wet torque is any bolt that is lubricated or coated with an antiseize compound.

    b. Dry torque is any bolt that is not lubricated or coated with an antiseize compound.

5. In Tables 1 through 4, locate the bolt to be torqued.

    a. Locate the diameter of the bolt.

    b. Determine the threads per inch for the SAE fastener or the thread pitch for the metric fastener.

    c. Slide across the table to the proper grade.

    d. Choose wet or dry.

    e. Slide down the proper column and across the proper row until they intersect, this is the proper torque value.

Table 1. SAE Standard Torque

		SAE GRADE NO. 2				SAE GRADE NO. 5				SAE GRADE NO. 8			
		DRY		WET		DRY		WET		DRY		WET	
DIA IN.	THREADS PER IN.	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM
1/4	20	66	7.46	49	5.54	101	11.41	76	8.58	143	16.15	107	12.09
1/4	28	75	8.47	56	6.33	116	13.10	87	9.83	164	18.53	123	13.89
5/16	18	135	15.25	101	11.41	209	23.61	157	17.73	295	33.32	221	24.96
5/16	24	150	17.17	112	12.65	230	25.98	173	19.54	327	36.94	245	27.68
3/8	16	240	27.11	180	20.33	370	41.80	278	31.40	523	59.08	392	44.28
3/8	24	272	30.73	204	23.04	420	47.44	315	35.58	593	66.99	445	50.27
7/16	14	384	43.38	288	32.53	593	66.99	445	50.27	837	94.55	628	70.94
7/16	20	428	48.35	321	36.26	662	74.78	496	56.03	935	105.62	700	79.07
1/2	13	585	66.08	439	49.59	904	102.12	678	76.59	1277	144.25	958	108.22
1/2	20	660	74.55	495	55.92	1020	115.22	764	86.30	1440	162.66	1080	122.00
9/16	12	70	94.92	53	71.87	109	147.80	82	111.19	154	208.82	115	155.94
9/16	18	78	105.77	59	80.00	121	164.08	91	123.40	171	231.88	128	173.57
5/8	11	97	131.53	73	98.99	150	203.40	113	153.23	212	287.47	159	215.60
5/8	18	110	149.16	82	111.19	170	230.52	127	172.21	240	325.44	180	244.08
3/4	10	172	233.23	129	174.92	269	364.76	201	272.56	376	509.86	282	382.39
3/4	16	192	260.35	144	195.26	297	402.73	223	302.29	420	569.52	315	427.14
1	8	--	--	644	873.26	483	654.95	909	1232.60	683	926.15		
1	12	--	--	704	954.62	528	715.97	995	1349.22	746	1011.58		

Table 2. Metric Standard Torque

DIA IN.	THREADS PER IN.	CLASS 4.6				CLASS 4.8				CLASS 5.8			
		DRY		WET		DRY		WET		DRY		WET	
		IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM	IN-LB	NM
3.0	0.5	.50	4	.40	4	.70	6	.50	4	-	-	-	-
3.5	0.6	.80	7	.60	5	1.10	10	.80	7	-	-	-	-
4.0	0.7	1.20	11	.90	8	1.60	14	1.20	11	-	-	-	-
5.0	0.8	2.40	21	1.80	16	3.30	29	2.50	22	4.00	35	3.00	27
6.0	1.0	4.00	35	3.00	27	5.66	50	4.20	37	6.90	61	5.20	46
8.0	1.25	9.90	88	7.40	66	13.60	120	10.20	90	16.70	148	12.50	111
10.	1.50	19.60	174	14.70	130	27.00	239	20.00	177	33.10	293	24.80	220
12.0	1.75	34.10	302	25.60	227	47.00	416	35.00	310	58.00	513	43.00	381
14.0	2.0	54.30	481	40.80	361	75.00	664	56.00	496	92.00	814	69.00	611
8.0	1.25	26.40	19	19.80	15	28.50	21	21.40	16	36.50	27	27.30	20
10.0	1.50	52.20	38	39.20	29	56.60	42	42.40	31	72.20	53	54.20	40
12.0	1.75	91	67	68	50	99	73	74	55	126	93	94	69
14.0	2.00	145	107	109	80	157	116	118	87	200	147	150	111
16.0	2.00	226	167	170	125	245	181	184	136	313	231	235	173
20.0	2.50	441	325	331	244	478	353	358	264	610	450	458	338
24.0	3.00	762	562	572	422	826	609	620	457	1055	778	791	583
30.0	3.50	1515	1117	1136	838	1641	1210	1231	908	2095	1545	1572	1159
36.0	4.00	2647	1952	1985	1464	2868	2115	2151	1586	3662	2701	2746	2025

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